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Improved Rotary Engine.

It is manifest that a rotary steam engine possesses, in theory, important advantages over an engine with a reciprocating piston. By a rotary motion a much greater velocity may be obtained, and hence far greater power may be derived from a machine of given weight. The motion is more regular, and the strain upon the parts is less; requiring less weight in the bolts and braces by which the engine is secured. These advantages have long been perceived, and a vast amount of study has been devoted to the task of overcoming the obstacles in the way of making a rotary engine work with economy and success. It is surprising that the principal one of these obstacles is simply mechanical; being nothing more than the difficulty of packing, then revolving drum. There is no difficulty in packing the end of the drum, and none in packing the side, but where the two packings meet at the corner the parts soon wear so as to leak. Mr. Fairbairn declared some years since that he believed this difficulty would never be overcome.

The accompanying engravings illustrate a rotary engine, which is believed to be free from all material objections, and to be practically successful in every respect.

Fig. 1 is a perspective view of the engine, the drawings being made from an engine that has been in operation a year in the basement of the *World* newspaper office. Fig. 2 is a longitudinal section. Fig. 3 is a cross section, and Fig. 4 is a longitudinal section of the revolving drum and its attachments. Similar letters refer to the same parts in all the figures.

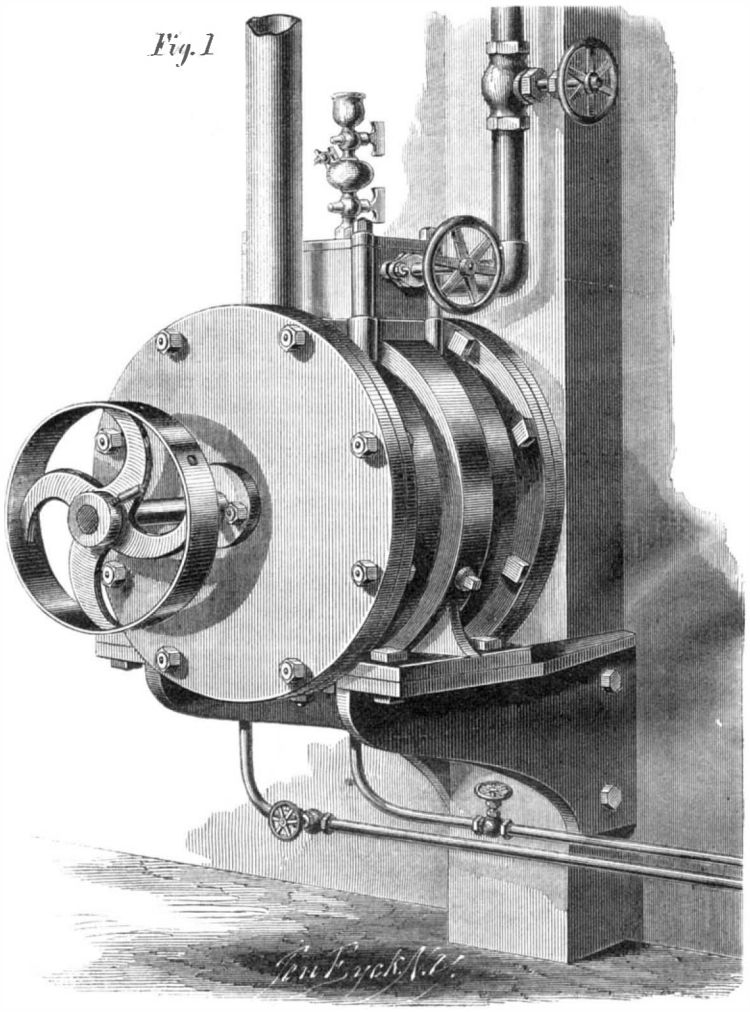

Fig. 1

A is the cylinder, D the rotating drum, secured to the shaft, S, which works in bearings in the cylinder heads, B B, eccentric to the cylider, so that the outer periphery of the rotating drum may work in contact with the packing piece, C. *b b* are circular bosses on the inner surfaces of the cylinder heads, B B, concentric with the cylinder, A. The rotating drum, D, fits snugly between the faces of these bosses, and has its ends packed, as shown in Fig. 3. F F F F are arc-formed guide plates, fitting in the recesses, *l l*, between the bosses, *b b*, and the inner periphery of the cylinder, A, and are as nearly semicircular as the eccentrical motion will allow, so that their ends may meet as they pass the center of the packing piece, C. To the centers of the opposite guides are attached the pistons, G H G H, as seen in the Figs. 3 and 4, each composed of two pieces, G and H. The portions, G, have their outer faces fitted to the inner periphery of the cylinder, A, with packing, *g g*, and permanently fastened to the said guides; thus they are kept in constant contact with the inner periphery of the cylinder, A. The portions, H H, are fitted to slide in the radial groove, *m*, in drum, D, with their edges packed, as seen in Fig. 4, and are connected to the guides by means of the bolts, *i i*, fastened upon their outer ends, and fitted to the concave recesses in the inner sides of the portions, G G, as shown in Figs. 3 and 4, thus allowing the parts, H H, to be radial to the drum, D, and the parts, G G, radial to the cylinder, A, throughout their entire revolution. I and J are induction and eduction parts, according to the direc-

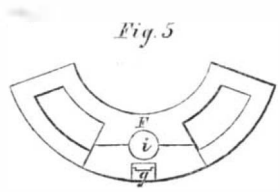

Fig. 5

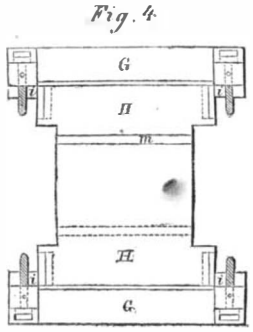

Fig. 4

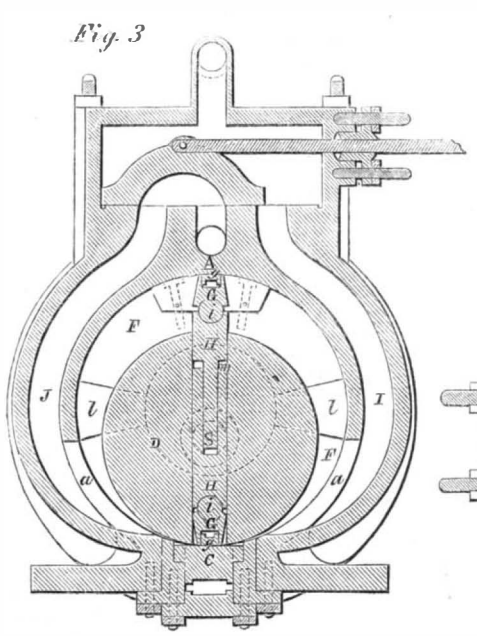

Fig. 3

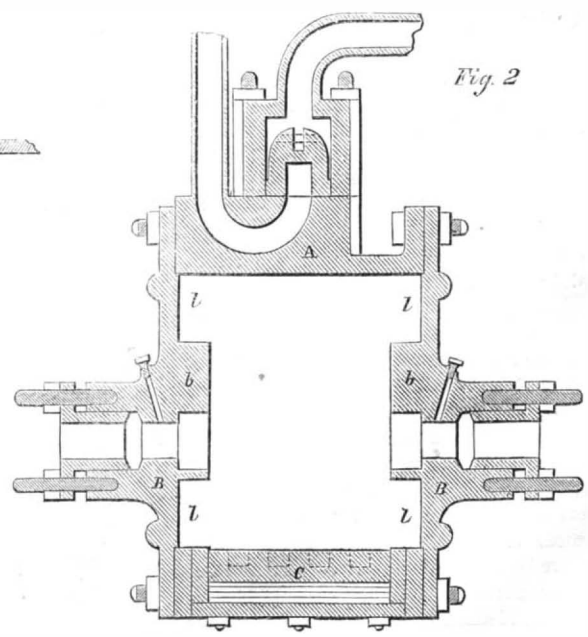

Fig. 2

KENYON AND THEODORE COX'S ROTARY ENGINE.

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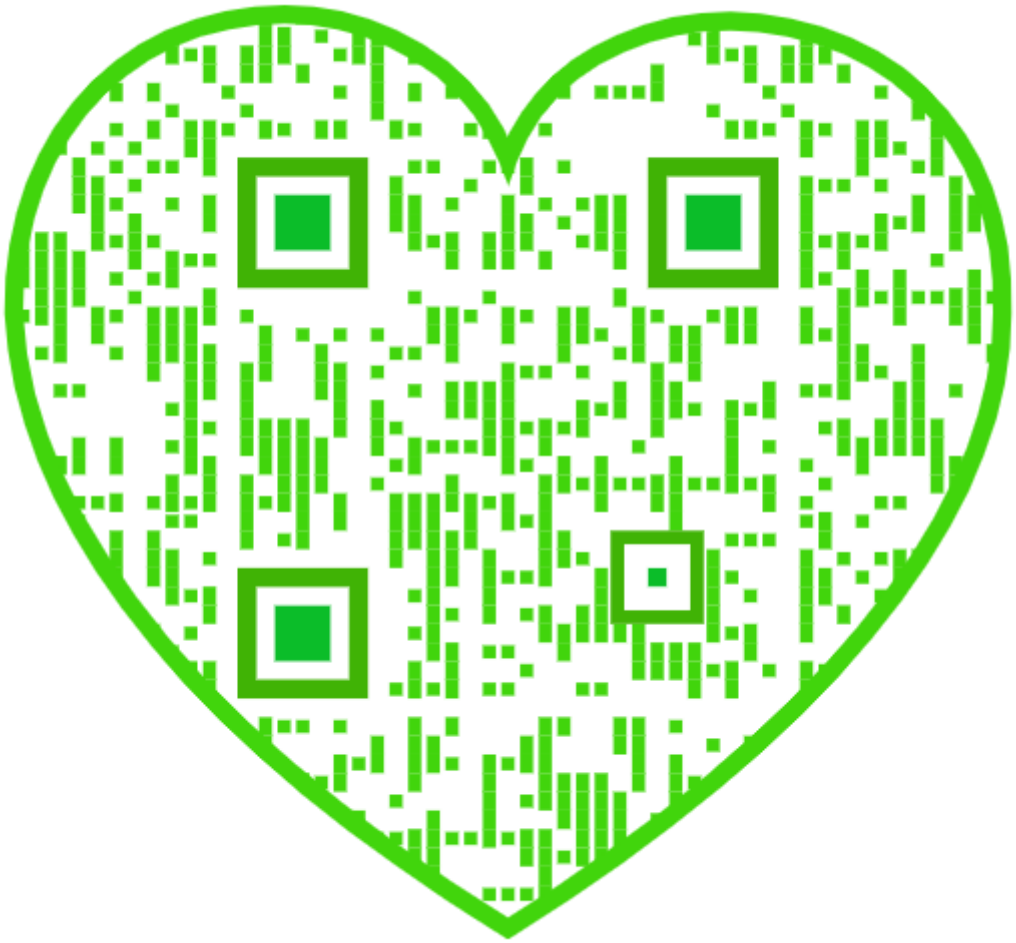

tion the drum and pistons are desired to rotate; the inner orifices of these parts are elongated, see *a a*, extending from the piece, C, to a line drawn diametrically through the axis of the drum, D, as shown in Fig. 3, admitting steam or water on both sides of the pistons after they have passed the packing piece, C, on the induction side, until they pass the upper ends of the ports, and *vice versa* on the eduction side. Thus the pistons are only operative during that half of their revolution in which they present the greatest surface between the drum, D, and the cylinder, A. The drum, D, is set into the inner periphery of the cylinder sufficiently to give it a bearing across the greatest width of the opening made for packing piece, C, so that the guides, F F F F, and pistons, G H G H, rotating concentric to the inner periphery of cylinder, A, pass the packing piece, without danger of its obstructing them, the packing, *g g*, is prevented from springing out of place by its bearings at both ends upon the outer periphery of the recesses, *l l*.

Patents for this invention have been procured through the Scientific American Patent Agency in the United States, England, France and Belgium; the American patent bearing date October 16, 1860. Further information in relation to it may be obtained by addressing the inventors, Kenyon and Theodore Cox, at No. 22 William street, New York.

NOTES ON MILITARY AND NAVAL AFFAIRS.

BATTLE AT PITTSBURG LANDING—ANOTHER IMPORTANT RAILROAD MOVEMENT.

No official report of this awful battle has yet appeared, but enough is known respecting it to justify the conclusion that it was by far the most terrific engagement ever fought on this continent, and perhaps one of the greatest of modern times. The Federal forces under Gen. Grant amounted to about 35,000 men, while those of the enemy are estimated at from 75,000 to 100,000 under command of Generals Albert S. Johnston, Beauregard, Bragg, Polk and others, the very best officers in the Confederate army. The forces of these several generals were all combined for the purpose of making a desperate attack upon our comparatively small force with the hope of destroying Gen. Grant's army before Gen. Buell's reinforcements could reach the scene of action. Our forces were thus surprised on Sunday morning by overwhelming forces of the enemy, who succeeded in capturing a portion of Gen. Prentiss's brigade, including the General himself.

The engagement raged with unabated fury all that day, the Confederates steadily pushing back our forces, but meeting with an occasional repulse, until it seemed at nightfall that the whole Federal force would either be captured or utterly routed. The fight, as described by an eye witness, was most terrible. It seemed at times as though legions of demons had been let loose to fight and kill and to drink each other's blood. The fortunes of war were decidedly against our forces up to 4 o'clock on Sunday afternoon. The enemy had driven our forces back some distance from their encampments, and had captured several of our guns, and the day seemed to be nearly lost. At the critical moment the advance guard of Gen. Buell's army appeared on the eastern bank of the Tennessee, and during that eventful night crossed, and our forces prepared to engage the enemy early in the morning. During all this time two wooden gunboats were firing upon the enemy near the river's bank, and did valuable service, breaking his line and compelling a change of attack on the following morning.

The battle was renewed early on Monday morning, under the immediate command of Gen. Buell. His various divisions, under Generals Nelson, Crittenden, McCook, McClernand, Wallace and others, steadily drove back the enemy after a severe and bloody engagement. Our camps and lost guns were recaptured, and some rebel artillery taken, and the enemy being defeated, fled back to his entrenchments at Corinth, where he must either fight very soon or flee to some other position.

Major General Halleck is now in command of the army in person, and has signalized his disposition to push forward the attack by sending an expedition to the rear of Corinth, on the Mobile and Ohio Railroad, destroying two bridges—one measuring 121 feet and the other 210 feet span—but without any lives being lost.

The list of killed and wounded at the battle of Pittsburgh is not reported, but must be very great on both sides.

The first impression that strikes the mind seems to be that our advance at Pittsburg was in a bad position to resist the attack of a superior force, and it appears, in spite of the bravery of our generals on the occasion, that they did not show vigilance or skill in their preparation to meet a sudden attack. We do not like to criticise the acts of these brave men, but somehow we think there was a want of care, when we know they were surrounded by spies in the midst of the enemy's country. After all, however, that victory is ours, let us rejoice and give thanks.

IMPORTANT MOVEMENT—ADVANCE INTO ALABAMA.

General Mitchel, in command of the third division of the national forces, has achieved one of the most important successes of the whole campaign. The following dispatch, from Huntsville, Alabama, was received at the War Department on the 12th inst., and explains his operations:—

HEADQUARTERS THIRD DIVISION,
Huntsville, Ala., April 11, 1862.

After a forced march of incredible difficulty, leaving Fayetteville yesterday at 12 o'clock, M., my advanced guard, consisting of Twichin's brigade, Kennett's cavalry and Simonson's battery, entered Huntsville this morning at 6 o'clock. The city was completely taken by surprise, no one having considered the march practicable in the time. We have captured about 200 prisoners, 15 locomotives, a large amount of passenger and box platform cars, the telegraph apparatus and office, and two Southern mails. We have at last succeeded in cutting the great artery of railway communication between the Southern States.

Not content with the mere occupation of the town, Gen. Mitchel set to work at once to make the movement effectual, and the last accounts from him state that he had sent out two expeditions from Huntsville on the cars. One under Col. Sill, of the Thirty-third Ohio, went east to Stevenson, the junction of the Chattanooga with the Memphis and Charleston Railroad, which point they seized, 2,000 of the enemy retreating without firing a shot. Col. Sill captured 5 locomotives and a large amount of rolling stock. The other expedition, under Col. Turchin, of the Nineteenth Illinois, went west, and arrived at Decatur in time to save the railroad bridge, which was in flames. Gen. Mitchel now holds one hundred miles of the Memphis and Charleston Railroad.

In this movement Gen. Mitchel has accomplished great results, viz., that of breaking up the direct line of railway connection between Virginia and the Southwestern States, thus dividing the two Confederate armies in twain, beside securing a large number of locomotives, rolling stock, supplies, &c., which must severely cripple their future movements. They can ill afford to lose a single item in their catalogue of mechanical appliances. Some of our readers may not be aware that the gallant officer who led on this important movement, is none other than Professor Mitchel, the celebrated astronomer.

SKETCH OF GEN. MITCHEL.

The "New American Encyclopedia" furnishes the following sketch of this distinguished man:—

Ormsby M. Mitchel, born in Union Co., Ky., August 28, 1812. At 12 years of age, with a good knowledge of Latin and Greek and the elements of mathematics, he commenced the world for himself as clerk in a store in Miami, Ohio, and afterward removed to Lebanon, Warren Co., where he had been educated. There he received a cadet's warrant, and earned the money that took him to West Point, which place he reached, with a knapsack on his back and 25 cents in his pocket, in June 1825. On graduating in 1829, he was made acting assistant professor of mathematics, which post he held for two years. From 1832 to 1834 he was counsellor at law in Cincinnati, Ohio, from 1834 to 1844 professor of mathematics, philosophy, and astronomy at Cincinnati college; in 1836 and 1837 chief engineer of the Little Miami railroad; and in 1841 a member of the board of visitors of the military academy. In 1845, at the close of a course of lectures on astronomy in Cincinnati, he proposed the establishment of an observatory at that place; and the proposition having been at once carried out, mainly by his own exertions, he became director of the institution. The ground for the building was given by Nicholas Longworth, Esq. The building is of stone, 80 feet in length and 2½ stories high. The principal instrument is the great refractor equatorially mounted and made by Merz and Mohler of Munich. It cost $10,000, which Prof. Mitchel obtained by subscriptions, mostly of $25 each, in Cincinnati. In 1859 he became director of the Dudley observatory at Albany, retaining at the same time his connection with that at Cincinnati. Prof. Mitchel is eminent as a popular lecturer on astronomy, and scarcely less distinguished for his mechanical skill, by the aid of which he has perfected a variety of apparatus of great use to astronomy. One of the most important of his constructions is an apparatus at Albany for recording right ascensions and declinations by electro-magnetic aid to within 1-1000 of a second of time, and for the measurement with great accuracy of large differences of declination, such as the ordinary method by micrometer cannot at all reach. Prof. Mitchel has carefully investigated the velocity of the magnetic current. Among his discoveries are the exact period of rotation of Mars, and the companion of Antares or Cor Scorpii. The most popular and characteristic of his published writings is "Planetary and Stellar Worlds," a collection of earlier public lectures. He is the author also of a treatise on algebra, and of a "Popular Astronomy." In July, 1846, he published the first number of the "Sidereal Messenger," the first periodical attempted in the United States devoted exclusively to astronomy. About the end of the second year it was abandoned for want of patronage. Prof. Mitchel has devoted much time to the remeasurement of Prof. W. Struve's double stars south of the equator. The work was undertaken at the special request of that astronomer, and has resulted in a number of interesting discoveries.

At the outbreak of the great rebellion Prof. Mitchel promptly offered his services to his country. He was educated at West Point, and in thus early espousing the cause of his government he doubtless felt that he was defending his paternal guardian. He received the commission of a Brigadier General of Volunteers, and has shown in all his operations a wonderful degree of energy and determination. From our personal knowledge of Gen. Mitchel we feel well assured that the grass will not grow under his feet. The President, in appreciation of his valuable services, has promoted him to the rank of Major General.

Huntsville, the scene of Gen. Mitchel's gallant exploit, is a fine town of about 5,000 inhabitants, 116 miles southeast of Nashville. It contains many handsome brick buildings, among which are the Court House, which cost $45,000, and stone banking house, which cost $80,000.

MILITARY ENGINEERING—GUNBOAT CANAL.

After Gen. Pope's forces had taken the enemy's works at New Madrid, which lies below Island No. 10, he sent over the river a Corps of Engineers to ascertain whether or not it was practicable to establish batteries opposite the island, with a view to enfilade their works on the Kentucky shore. The corps spent three days in swamps, and reported that the project was impracticable. Some new project must be started to meet the emergency, and to Col. Bissell, of Rochester, N. Y., belongs the credit of supplying it—another evidence of the ready ingenuity of our loyal mechanics and engineers. The project was thoroughly executed and deserves notice. Col. Bissell stated that he could, by hard labor, get steamboats through the bayous, and by that means land our forces nearly opposite New Madrid, and take all the enemy's works in the rear. A correspondent of the Rochester *Union*, who was in Col. Bissell's regiment of engineers, says, in regard to the project:—"Tools we did not need, for the regiment carries every thing, from the heaviest ropes and screws down to fine steel drills for unspiking guns. Our route was about twelve miles long, of which two miles were through thick timber, and the remaining ten through narrow, crooked bayous grown up full of brush and small trees. We have cut our way right through, the track being fifty feet wide, in which thirty feet are required for the hulls of the boats. The timber is cut four feet below the surface of the water. In one short stretch we cut seventy-five trees thus deep, not one less than two feet through. The machines were rigged from rafts and our lowest flats, and worked each by about twenty men. In the first place three large launches went ahead to cut out and push out of the track the underbrush and driftwood; then three rafts followed, on which were the men, who cut down and cut off the trees; then the saws; then two large barges; then one of the steamboats. Very large lines were provided to run from the capstan of the steamboat and haul out by snatchblocks what the men could not handle. Then followed the rest of the fleet, men being engaged all the time converting the flatboats into floating batteries. From the river to the levee the distance is about 500 feet; here the water was shallow and the route full of stumps; it took one whole day to pass this. Then the cut in the levee. Here the fall was over two feet, and the rush of water was tremendous. The largest boat was dropepd through with five lines out ahead. Then a corn field, overflowed from a cut in the levee. Here was something of a channel cut by the swift water, and we got along well nearly a quarter of a mile, to the woods; here was the labor—two straight and long miles to the nearest point in the bayou. This it took eight days to get through. Then Wilson's Bayou, then East Bayou, then St. John's Bayou, which empties into the Mississippi at New Madrid. If you have never seen a Southern swamp you have no idea how thick it is; a New York elm swamp does not begin. It sometimes took twenty

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men a whole day to get out a half sunken tree across the bayou. Such a place as that kept us all back, as none of the rafts or flats could get by, and all had to wait. The water, after we got into the wood, was about six feet deep, with a gentle current setting across the peninsula. In the East Bayou the current was tremendous, and the boats had to be checked down with heavy head lines. Here we found some obstructions, caused by drift heaps; but cutting off one or two logs would start all down the current. This is the hardest job I have ever seen undertaken, but Col. Bissell is so far down now as to call it successful, for we are in sight of the fences on ''tother side of Jordan.' ''

A simple device was adopted for sawing off the stumps below the surface of the water. After the tree was chopped off above the water, an upright plank was fastened to the stump, and near the upper end of this plank a light frame was attached by a pivot. The sides of this frame consisted of two diverging rods extending down into the water to the depth at which the stump was to be cut. To the lower ends of the rods a saw blade was attached in a horizontal position, and by swinging the frame on its pivot the stump was sawed off. The saw, being limber, sagged sufficiently in the middle to form an arc of the circle described by the oscillation of the frame.

CAPTURE OF ISLAND NO. 10—GREAT SUCCESS.

We announced in our last number the capture of this somewhat famous island. The full extent of success may be summed up about as follows :—Prisoners taken; One major-general, two brigadier-generals, seven colonels, eleven lieutenant colonels, fifty-six captains, sixty-four first lieutenants, eighty-one second lieutenants; regimental officers for twelve regiments, about four hundred each; about four thousand privates, six hundred and fifty mules, twelve hundred horses, five thousand stand of arms, twenty-four field pieces—six and twelve-pounders, over one hundred pieces heavy artillery, four hundred wagons, and spades, axes, shovels, wheelbarrows, harness, tents and baggage without limit, together with some nine steamboats, valued as follows :—

Transport Prince, scuttled	$20,000
Transport Ohio Belle, saved	25,000
Transport Red Rover, saved	15,000
Steamer Yazoo, sunk on bar, but will be raised	40,000
Steamer De Soto, saved	50,000
Steamer Mars, saved	45,000
Steamer Admiral, saved	15,000
Steamer Winchester, burned	20,000
Steamer Champion, saved	5,000
Steamer Kanawha Valley, sunk	5,000
John Simmonds, gunboat, sunk	20,000
Grampus, gunboat, sunk	20,000
Mohawk, gunboat, sunk	18,000
Floating Battery, eight guns, saved	30,000
Total	$328,000
—Of which there was destroyed	143,000
Total saved	$185,000
To which may be added wharf boat and stores	50,000
Making a grand total of property saved afloat	$235,000

The capture of this island is one of the most gallant exploits of the war, and reflects great credit upon Commodore Foote, General Pope and all concerned.

FALL OF FORT PULASKI, GEORGIA.

A few days since we received a letter from a soldier, dated Tybee Island, March 20th. He informed us that the forces of General Sherman were busily engaged night and day in planting heavy mortars and rifled guns within 1,000 yards of Fort Pulaski, and expected to open on that doomed fortification in about two weeks from that date. News comes that this attack was commenced on the 11th inst., and after a terrible bombardment of a few hours the fort was surrendered. Col. Olmsted, the Confederate commander, signalled the day previous to the surrender that our fire was so terrible that no human being could stand on the parapet for a single moment. The Savannah *Republican* states that seven large breaches were made in the walls by the Federal batteries at King's Landing, and all the barbette guns and three casemated guns, on that side, were dismounted. The balls used were conical, and were propelled with such force that they went clear through the wall at nearly every fire, three of which entered the magazine.

The walls of Fort Pulaski are nine feet thick, and if it shall turn out that the breaches were made through the embrasures which are five feet through, the demonstration will be ample that henceforth fortifications without a sheathing of iron are practically powerless against the terrible impact of modern projectiles. The following description of this fort was written by Mr. Russell, of the London *Times*, who visited it soon after its seizure by the Georgia troops, May 1, 1861 :—

The fort is an irregular pentagon, with the base line or curtain face inland, and the other faces casemated and bearing on the approaches. The curtain, which is simply crenellated, is covered by a redan surrounded by a deep ditch, inside the parapet of which are granite platforms, ready for the reception of guns. The parapet is thick, and the counterscarps are faced with solid masonry. A drawbridge affords access to the interior of the redan, whence the gate of the fort is approached across a deep and broad moat, which is crossed by another drawbridge. The garrison of the fort is 550 men, and fully that number were in and about the work, their tents being pitched inside the redan or on the terreplein of the parapets. The walls are exceedingly solid and well built of hard gray brick, strong as iron, upward of six feet in thickness, the casemates and bombproofs being lofty, airy and capacious as any I have ever seen, though there is not quite depth enough between the walls at the salient and the gun carriages. The work is intended for 128 guns, of which about one-fourth are mounted on the casemates. They are long 32s with a few 42s and columbiads. The armament will be exceedingly heavy when all the guns are mounted, and they are fast getting the 16-inch columbiads into position *en barbette*. Every thing which could be required, except mortars, was in abundance—the platforms and gun carriages are solid and well made, the embrasures of the casemates are admirably constructed, and the ventilation of the bomproof carefully provided for. There are three furnaces for heating red-hot shot. It will take some hard blows before Georgia is driven to let go her grip of Fort Pulaski. The channel is very narrow and passes close to the guns of the fort.

The hard blows which Mr. Russell speaks of were struck on the 11th inst. with tremendous power and he " grip " is loosened.

IRON-PLATED WAR SHIP "GALENA."

This vessel, which our readers will find described on page 131, present volume, SCIENTIFIC AMERICAN, is now at the Brooklyn navy yard, receiving her armament. She will carry four 9-inch Dahlgren guns, and two 100-pound Parrott guns. Her rig is what is known in naval circles as that of an hermaphrodite brig, viz., brig rigged forward and schooner rigged aft. Since the fight between the *Merrimac* and *Monitor* some very important alterations in the plan of construction have been made, by which her strength and power of resistance will be rendered much greater than was at first deemed practicable. The most important of these alterations are, first, the extension of the heavy iron mail over the bow and stern of the boat, instead of using common plates, according to the original design; and, second, the increase to three and a quarter inches in thickness of the mail on the upper wall or shot-proof covering of the fighting deck which protects the batteries. This covering slopes inward at an angle of about forty-five degrees, and the sheathing was to have been but two inches in thickness. The changes, it is believed, will effectually protect the gunners, and render the vessel absolutely impregnable to ordinary projectiles.

CONTRACTS FOR GUNBOATS.

A board appointed by the Navy Department to examine plans and specifications for boats for the Western waters, consisting of Commodore Joseph Smith, Chief of the Bureau of Docks and Yards; John Lenthal, Chief of the Bureau of Construction; B. F. Isherwood, Engineer-in-Chief; Edward Hart, Naval Constructor, and Daniel B. Martin, Engineer in the United States Navy, have recommended that contracts be made with the following parties :—Tomlinson & Hartupee, Pittsburgh, for two iron vessels; Brown & McCard, St. Louis, three wooden vessels; George C. Bestor, Cairo, one wooden vessel; James B. Eads, St. Louis, two iron vessels. The aggregate cost of the eight vessels will be $1,229,500. We should judge from this announcement that the Navy Department is not yet satisfied with wooden walls.

SIEGE OF YORKTOWN.

Gen. McClellan is busy on the peninsula in his preparations to reduce the strong works of the enemy at Yorktown. Skirmishing is continually going on between the advance guards, and soon we may expect to receive the most stirring intelligence. The fortifications of the enemy are reported to be much more extensive than at first supposed, and his force very large. We have confidence in the triumph of Gen. McClellan; and but that our iron-clad batteries at Hampton Roads are detained there by the harassing presence of the *Merrimac* they would be able to lend him efficient aid in his great work. It required a bloody siege of nearly one year on the part of the Allied forces to take the works in and around Sebastopol. Let us have some patience now with the operations of our heroic commander.

INTERESTING MISCELLANEOUS ITEMS.

Extensive preparations are making to attack Fort Macon, near Beaufort, N. C. It is garrisoned by about 600 men, and the commander has neither surrendered nor blown up the fort, as previously reported. He is said to be an impulsive man, and promises his men destruction rather than surrender.

Pass-Christian, in Mississippi, on the Gulf, is now in possession of the Federal forces. This point is about 50 miles east of New Orleans on the way to Mobile.

From New Mexico we have reports which are somewhat unfavorable. It is believed that Santa Fé, the capital, is held by Texan forces, and that a provisional government has been established. Time, however, will cure this raid into New Mexico, and before long matters there will return to their normal condition.

The Secretary of the Navy still claims the confidence of the country, and yet, so far as we know, he still holds on to those mechanics and naval architects upon whom he has hitherto relied, and who have, thus far, in a great measure deceived him in regard to iron-clad vessels. We would like to know the name of that naval constructor who turned his back on Donald McKay and pronounced his iron-plated plans a humbug. We wonder if the Secretary of the Navy still trusts him.

Petitions are being presented to Congress in favor of a ship canal to connect the Mississippi river with Lake Michigan.

The people of the Northwest deem it highly important that the Illinois Canal should be widened to admit the passage of gunboats from the Mississippi to the Northern lakes, to meet the possible exigency of a war with England.

Another Monster Gun.

One of Rodman's fifteen-inch guns was successfully cast a few days ago at the Fort Pitts Works in Pittsburgh. This is the third casting made of these guns, and the work will soon be regarded as an every-day performance. The process was as follows: The rough casting in the pit weighs about 78,000 pounds, and nearly forty tuns of metal were melted for the purpose in three furnaces. The furnaces were fired about five o'clock, and at eight minutes past ten the first furnace was "tapped." A line of troughs or "runners" had been laid from the furthest furnace, some eighty feet, the second furnace, about midway, joining in, and the two streams, emptying, with that from the first furnace, into a large cauldron at the edge of the pit, from which two streams diverged, and, passing around the pit, emptied into the gun on opposite sides of the core barrel. The furnaces were tapped in succession, and nearly all the metal allowed to run out before the next in order was opened. At twenty-four minutes past ten the mold was filled, in just sixteen minutes from the opening of the first furnace, showing that the metal must have poured into it at the rate of nearly two and a half tuns per minute.

More Large Guns Ordered.

The Pittsburgh *Chronicle* says :—"We understand that the Navy Department has ordered the casting of fifty 15-inch Dahlgrens at the Fort-Pitt Works, in this city. The draughts for the moulds, &c., have been prepared by Captain Dahlgren, and it is understood that the guns will be much shorter and thicker than 15-inch Rodman gun. Most of them will be smooth bored, and are designed for use on board the new vessels, of the *Monitor* style, and others, whose construction has been already directed by Secretary Welles. These guns will weigh, in the rough, over seventy thousand pounds each, and will carry a ball weighing over three hundred pounds. They will doubtless be ready by the time the vessels for which they are intended are completed."

THE Madrid Academy of Sciences offers, among other prizes, one for the solution of the following :—To determine the probable errors implicated in topographical plans deduced from two photographic perspective views, taking into account all the sources of error that may possibly exist. The prize will consist of a gold medal, and the sum of 6,000 reals ($150.) The papers written in Spanish, or in Latin, must be addressed to Don Aguilar y Vela, perpetual Secretary of the Academy of Sciences, Madrid.

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Improved Variable Exhaust.

The locomotive steam engine is the result of a long series of discoveries and inventions, commencing in the unknown ages when the expansive force of steam was first observed; but to George Stephenson is awarded the credit of the two important inventions that crowned the series and made the locomotive a practical machine, thus inaugurating the system of railroad locomotion. These inventions were the multitubular boiler which diminished so much the bulk of the machine, and the plan of discharging the exhausted steam into the chimney to increase the draft. Since Stephenson's exhaust was first introduced, many devices have been invented for varying the flow of the steam into the chimney for the purpose of controlling the combustion and regulating the fire. It is conceded by nearly all locomotive engineers who have had any experience in the use of variable exhaust arrangements, that there is a very great saving effected by their proper use; the uniformity of the fire causing an economy of fuel and preventing the destruction of the boiler.

The expansion and contraction of the flue sheet, when cold air has to be admitted by the furnace door, to endure the pressure, is also prevented. The difficulty of getting many of the devices for varying the draft in the furnaces of locomotives to work properly after they have been in use a short time, on account of the sediment or dirt formed by the action of the steam, smoke and ashes, as well as the great difficulty experienced from back pressure, has obstructed their introduction, and has been the cause of their removal in many cases after a short trial.

The accompanying engravings represent a plan of variable exhaust which, after constant use for the past two years, is claimed to have proved itself free from all objections. This arrangement presents a smooth surface and true taper on the inside of the waste-steam pipe, thereby preventing the formation of eddies and avoiding back pressure. There will be no deflection of the steam from the center of the cone if the waste-steam pipes are properly set up. As the waste steam is discharged through one orifice, there is no back pressure created by the changing of the nozzles when working a heavy head of steam. The nozzles can be changed with perfect ease when working full throttle, they are provided with an arrangement which prevents all possibility of their becoming set on their seat. This exhaust gives three sizes of nozzles, the largest being the full size of the waste steam pipe.

The ease with which this exhaust can be applied, as well as its simplicity of parts and cheapness, must recommend it to the consideration of those interested in the operation of railways.

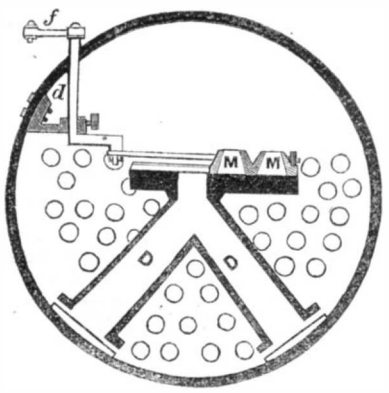
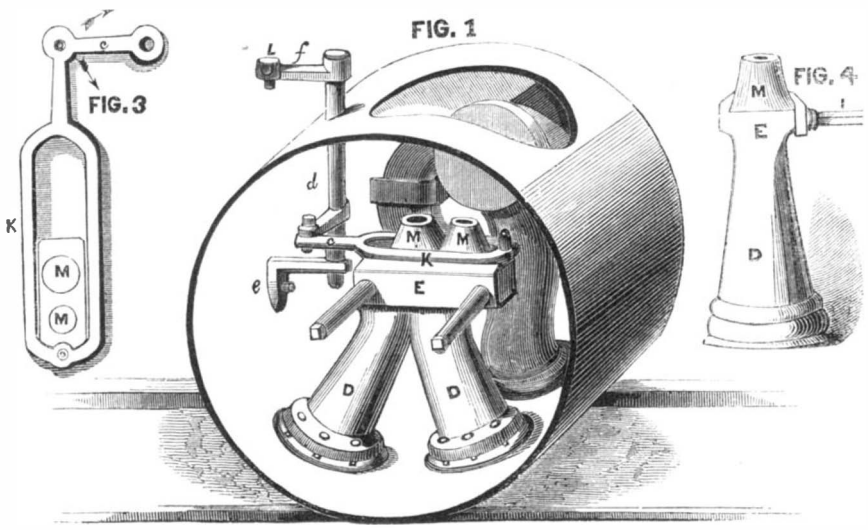


Fig. 1 is a perspective view of the front end of the smoke arch, with the front plate removed, showing the exhaust arrangement in full. Fig. 2 is a cross-sectional elevation of the exhaust pipe, D D, and the nozzles, M M, as well as the arrangement for moving the nozzles. It will be seen by Fig. 2 that the exhaust pipes, D D, both terminate in a single orifice; as the nozzles now stand the steam would be discharged out of an orifice the full size of the exhaust pipe, but if the first nozzle, M, be drawn over the orifice the blast would be contracted; if the second one is brought over the blast it would be contracted still more, and *vice versa*. Fig. 3 is a plan of the nozzles, M M, and the slotted connection, K, for moving the same. Fig. 4 is a longitudinal elevation of the seat, E, on which the nozzles, M M, slide, being held in their places as seen in Fig. 4; the front lug is detached from the seat, E, but is held in its place by the bolt, I, which, in case the nozzles have any tendency to stick, can be turned outward, allowing the front lug to recede, thereby relieving the nozzles. The bolts, I, extend through the front plate of the smoke arch when found necessary, so that they can be turned from the outside of the arch, which does away with any necessity for opening the smoke-arch door, to loosen the nozzles when they become set; that will not happen but once or twice, and that only when they are first applied.

It will be seen by inspecting the cuts that the upright rocker shaft, *d*, and attachments are not the same in Fig. 1 as in Fig. 2; either style of course would do, but the style in Fig. 2 is the cheaper and better.



LATHROP & CO.'S VARIABLE EXHAUST.

The patent for this invention was granted Dec. 18, 1860, and any further information in relation to it can be obtained by addressing Geo. W. Lathrop, Weedsport, N. Y.

Criticism on the Turkish Bath.

The London *Lancet* contains the following criticism on the much-lauded Turkish steam bath: The application of heat and friction bears no relation to cleanliness; the most perfect cleanliness may be attained by soap and water. The stimulation of the skin to renew its epidermal coat by steaming and rubbing is not a process of cleansing, any more than blistering it, or effecting a similar renewal with tincture of iodine. Nature has been so bountiful and provident as to provide the body with the means of resisting great extremes, whether of heat or cold. The processes of life can only be carried on at a temperature nearly invariable, or varying within very narrow limits. To combat cold climates there is a great power of producing heat internally in the body; and to combat high climates the body is provided with an evaporating apparatus—the skin. That profuse perspiration which some gentlemen regard with such triumph, is the protest of nature against their hot chambers. It should be their humiliation. If they could carry out their theories, and act upon the body by heat as they would upon meat, they would indeed produce an alteration of temperature in the tissues which would effect a cure of all diseases—a *dead* cure; their patient would be *mort guéri*. But, fortunately for themselves, they cannot prevent the compensating balance which nature has placed there to oppose great alterations in the temperature of the body. They cannot remove it; but they may overstrain and crack it. The palpitating heart, the rapidly expanding lungs, may yield beneath the strain, and blood may flow, fainting may follow, or death result. This is what medical practitioners know, and would feel themselves culpable if they lost sight of. Nothing seems more unlikely and undesirable than that the Turkish bath should ever become the habit of a large portion of our population. It could serve no good purpose for healthy men, and would injure very many unhealthy men.

Cultivation of the Sweet Potato.

The following extracts are from the *Ohio Valley Farmer*, by M. M. Murray:—

Select rolling ground, mellow and warm. Dry but not too barren knolls, well manured, are good. New land, if dry, produce bountiful crops of fine quality. Manuring in the hill or ridge is best where the land is not in first-rate tilth. Plow a shallow furrow, put the manure in and throw up a ridge over it. The soil, in all cases, must be finely pulverized. Throw two heavy furrows together, forming high ridges. Three and a half feet apart, from center to center, is the proper distance. On a small scale in gardens the ridges may be made with a hoe. Mechanics in country villages should cultivate a patch of sweet potatoes. Never work the soil when it is very wet. Keep the roots moist and the tops shaded until planted. If you have not many to plant, choose the afternoon or evening for planting. The best instrument for planting with, is a mason's trowel. Thrust it lengthwise of the ridge in the center (not across it), a little obliquely, so that in bringing it out and to you it will form a cavity admitting the plant with roots well spread. Withdraw the trowel with one hand, at the same instant you thrust the plant in with the other and let the dirt fall back to its place. Press it compactly at the roots. Severe pressure is indispensable to success. Plant an inch or more deeper than they stood in the bed, so that the stems of the lower leaves may be covered, as then they will sprout again, if cut off by frost or worms. In ridges plant fifteen inches apart. Plant from the 15th of May until the middle of June, or as early as safe from frost. In southern Ohio, Indiana and Illinois, and throughout Kentucky, they may be planted as early as the first of May, many seasons. An early start is important, but it is best to be on the safe side of the frost.

About ten days after planting, commence stirring the ground to prevent the growth of weeds. Hoe often enough to keep the weeds down. Be careful not to strike with sharp hoes so near the plant as to cut off the young potatoes. When the vines commence running, place a common adjustable cultivator between the ridges, tearing down the sides somewhat, and follow with a shovel plow to replace it. Do not cover the seeds of vines with soil. Dig for immediate use at any time when they are large enough. Dig the crop when the leaves are first nipped with frost. Cut the vines each side of the ridge with an old scythe. Dig with broad-tined forks, by thrusting down between the plants.

The Cotton Manufacture of England.

In the United Kingdom there were, in 1861, in all, 6,378 factories, which contained 36,450,000 spindles; and 490,866 power looms, which engaged 230,564 hand-loom weavers. The aggregate steam power, according to the average indication, and expressed in horse power, was 375,294; and the water power, measured in the same way, 29,339; together, therefore, equal to 404,633 of horse power. The total number of hands employed was 775,534, whereof 308,273 were males and 467,261 females. This gives an average of one hundred and twenty-one hands to each description of factory. The number of children under thirteen years of age attending school was 54,411—namely, 23,863 boys, and 30,548 girls.

A CHANGE.—Not many weeks ago the secessionists expelled from Nashville the venerable Judge Catron, of the United States Supreme Court, for persisting so firmly in his loyalty to the National Government. He is now about to return to that city to try for treason the individuals who maltreated him.

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The regular weekly meeting of the Association was held at their rooms at the Cooper Institute on Wednesday evening, April 10th, the President, Prof. Joy, in the chair.

The half hour previous to the appointed discussion, which is usually devoted to miscellaneous business, was occupied in an examination of the process of making iron, described on page 225 of the current volume of the SCIENTIFIC AMERICAN. It will be remembered that this is a plan for making wrought iron direct from the ore. A cylinder 20 feet in length and 6 feet in diameter is hung upon journals directly over a reverberatory furnace, and is slowly rotated by machinery, making one revolution in 20 minutes. The ore is finely pulverized and mixed with semi-bituminous coal, also pulverized, in the proportion of 75 lbs. of ore to 25 lbs. of coal. This mixture is fed into the cylinder at one end in measured charges of 25 lbs. each, and as the cylinder rotates a spiral flange inside carries the ore and coal slowly along the cylinder to the opposite end, where they fall down into the puddling furnace. The rotating cylinder is heated to a dull red heat, and the ore is 6 hours in passing through it, traveling in its spiral track about 300 feet. From the puddling furnace the metal is taken in the form of wrought iron of a good quality. No flux is used.

Dr. STEVENS exhibited a model of the apparatus and explained its operation.

Prof. SEELY—I would ask if there is any evidence that the iron is reduced in the cylinder?

Mr. ROGERS—We have the apparatus in operation at Newark, and should be pleased to show it to the gentleman. It has been examined by the most scientific men we have, and it is making good iron. We claim three advantages for it—that the apparatus can be erected at very low cost, that we make wrought iron at a saving of $10 per tun, and that the iron is of a good quality.

Prof. SEELY—Have you ever tried the experiment of dispensing with the cylinder--putting your ore and coal directly into the furnace without passing them first through the cylinder? It is contrary to all the facts with which I am acquainted, to suppose that the iron can be reduced from its ore in that cylinder. Iron is decomposed by hydrogen at a low red heat, but not by carbon. If the experiment has not been tried of putting the ore and coal directly into the furnace, I suggest that it be tried.

Mr. DIBBEN—The advantage of this arrangement is that the ore and coal are partly heated for the puddling furnace by the waste heat of the furnace. But the great difficulty in all these direct processes of making iron, where no flux is used, is to get rid of the silica and other foreign substances contained in the ore.

Prof. RENWICK—I would ask if any other ore has been tried than the Dickinson ore? The Dickinson ore is very easily reduced. It can be done in a common blacksmith's forge. There is no difficulty in making a horse shoe from this ore at any blacksmith's fire. This plan of making wrought iron direct from the ore, is the oldest of all processes, and is the one now in use among all barbarians. It requires, however, a very rich ore, and has never yet been made economical.

Mr. COOPER—Ten years ago there was in operation at the Trenton Iron Works an apparatus precisely similar to this. It made good iron, but there was a practical difficulty in the cylinder warping, and it was laid aside. The iron would be reduced in the cylinder in this way. A little atmospheric air would get in with the coal and ore, and the oxygen of this air would combine with the coal at the dull red heat to form carbonic oxide; then, as oxygen has a stronger affinity for carbonic oxide than it has for iron, it would leave the iron and combine with the carbonic oxide producing carbonic acid, and leaving the iron in the metallic state. The silex would be got rid of as silicate of iron, thus reducing the yield of the ore.

[It is due to Mr. Cooper to state that he had not examined the apparatus, as had he done so he would not probably have given this explanation. Very careful provision is made for excluding all air except that which fills the interstices between the particles of the ore and coal. As it takes 33 lbs. of oxygen to burn 25 lbs. of coal into carbonic oxide, and as oxygen forms only about 23 per cent of the atmosphere, it would require 150 lbs. of air for each charge of ore and coal. This would be equal to about 2,000 cubic feet of air—enough to fill a room 10 feet wide, 10 feet high and 20 feet long. This could not be contained in the interstices of 100 lbs. of ore and coal. —EDS.]

The PRESIDENT—The time has arrived for the discussion of the regular subject selected a fortnight since. It is

NAVAL WARFARE.

Mr. DIBBEN opened the discussion in a sketch of the history of iron-plated ships.

Prof. RENWICK—There are some facts in the history of this art which were not stated in the highly satisfactory address to which we have listened. Iron-plated ships were first suggested by John Stevens, the father of Robert and Edwin. In regard to the columbiads, the first one was designed in 1803. Drawings were made by Major Williams, and a 100-pounder was cast and placed in Castle William, on Governor's Island, in this harbor. Elongated projectiles were invented by Robert L. Stevens before the close of the war of 1812. I was present at a trial of them during the war, and that trial was not successful, the shells did not explode. In 1817 there was another trial, at which I was not present, but I was informed that it was successful. A number of shells were made and placed in boxes and deposited in Castle William to be ready for use.

Mr. BABCOCK—A number of steel shot have been recently prepared for the government and placed on board the *Naugatuck*, Stevens's little boat, to be used in a 100-pounder Parrott gun against the *Merrimac* if she again ventures out. They are of solid cast steel, of the acorn form, with the point terminating in a cylinder 3 inches in diameter and about 3 inches long, with a perfectly square end, the corners being nicely finished to a cold chisel edge. It is thought that if they do not penetrate the side of the *Merrimac*, they will at least catch into the plates with sufficient hold to tear them from their places. I am told that the *Merrimac* has precisely similar shot, weighing 360 lbs. each, with which to attack the *Monitor*.

Prof. JOY—It is remarkable that 81 years ago they were discussing the very subject which is engaging our attention at this time, and in reference to the same locality. I hold in my hand an order from Washington in relation to boats at Yorktown to protect the French fleet from fire-ships. Washington wished Count de Grasse to sail up York river with his fleet, and thus make the capture of the Bri ish army certain, but the Count declined to do this unless Washington would furnish boats to prevent his vessels from being burned. This order was accordingly issued. It is dated October 15, 1781. Hostilities ceased on the 17th, and the surrender was made on the 19th; so this is among the last of the military orders issued by Washington. (Prof. Joy then read the order. It directs the officer to take the boats out of James river and place them on wheels and send them over to the headquarters of the army before Yorktown. The order directs that the boats shall be covered with boughs to prevent them from being seen by the enemy.)

The same subject was chosen for a fortnight hence, and the meeting adjourned.

The Boyden Premium.

Uriah A. Boyden, Esq., of Boston, Mass., has deposited with the Franklin Institute the sum of one thousand dollars, to be awarded as a premium to "any resident of North America who shall determine by experiment whether all rays of light, and other physical rays, are, or are not, transmitted with the same velocity."

The following conditions have been established for the award of premium:—

Any resident of North America, or of the West India Islands, may be a competitor for the premium. The Southern boundary of Mexico being considered as the Southern limit of North America.

Each competitor must transmit to William Hamilton, Actuary of the Franklin Institute, Philadelphia, a memoir describing in detail the apparatus, the mode of experimenting, and the results; and all memoirs received by him before the first day of January, 1863, will, as soon as possible after this date, be transmitted to the Committee of Judges.

Every memoir shall be anonymous, but shall contain some motto or sign by which it can be recognized and designated, and shall be accompanied by a sealed envelope, indorsed on the outside with the same motto or sign, and containing the name and address of the author of the memoir. It shall be the duty of the Actuary of the Franklin Institute to keep these envelopes securely and unopened until the Judges shall have finished their examination; when, should the Judges be of opinion that any one of the memoirs is worthy of the premium, the corresponding envelope shall be opened, and the name of the author communicated to the Institute. The other envelopes shall be destroyed without being opened.

Oriental and French Carpets—French Taste Criticised.

A late number of the *Revue des Deux Mondes* contains a cutting article on the taste of his countrymen by M. Adalbert de Beaumont. He says:—

It is impossible to devote more talent of invention than is at present employed in the production of frightful carpets. The largest carpet exhibited in 1855 (at the Paris International Exhibition) was hung in the rotunda, and represented a forest: a stone staircase rose spirally in the midst of pine trees adorned with rhododendron flowers: scattered about were monkeys, tigers and all sorts of brilliant plumaged birds. If this stuff, the color of which was even more detestable than the design, had been intended for the panels of a gallery, it might have been excused as a picture; but, it was designed and manufactured to be trodden on; the tigers were to be crushed, the paroquets smashed, and the ravines and waters walked on, and over, by fashionable boots and shoes. It is lamentable to think that the great (French) manufacturers of *Gobelins*, *La Savonnerie*, *Beauvais*, *Aubusson*, all follow these false principles. The true designs for textile fabrics which please the eye, and accord with common sense, are flat, arabesque flowers, and the geometrical patterns, of which India and Persia afford us such perfect examples. It is not only in the arts of design that the Orientals excel us; their methods of dyeing stuffs in different colors, adorning them with flowers and ornaments, prove their high degree of chemical skill. The processes described by Pliny are exactly the same as those employed at the present day. The brilliancy and purity of the colors of the woolen, silk and cotton stuffs, manufactured at Tripoli, in Tunis, and Morocco, prove that the ancient traditions have been preserved, which are very superior to the processes of modern science. The most brilliant results were formerly obtained from an attentive study of Nature. We were present, says M. de Beaumont, at the Universal Exhibition of 1855, when, at the request of the jury and in the presence of the commissioners from Lyons, the representative of the (English) East India Company opened his choicest stores, and we can testify that the manufacturers present were astounded —stupefied is the word—at the sight. In spite of their self-conceit as manufacturers, in spite of their national pride, they were compelled to admit that not only were they unable to produce similar marvels, but that they could not even understand how they were produced. The embroiderer of Lahore or Constantinople, the dyer and weaver of Broussa or Damascus, the potter of Tebriz, the carpet-weaver of Ispahan or Chiraz, the enameler of Bagdad or Teheran, know more about color and form than all our chemists, all our designers, our ornamental painters and manufacturers put together.

There is some Ruskinism in this criticism, but on the whole it is correct. There is a frightful reaching after something merely new and striking, in all branches of the ornamental art, without much regard to the laws of natural taste.

ANOTHER ASTEROID DISCOVERED.—A planet of the thirteenth magnitude was discovered on the morning of the 8th inst., at the Observatory of Harvard College, by Mr. H. P. Tuttle. It is the third which has been detected at that Observatory within the past twelve months. It has been named *Feronia*. This is now asteroid 72°.

NATURE is a great believer in compensations. Those to whom she sends wealth she saddles with lawsuits and dyspepsia. The poor never indulge in woodcock, but they have a style of appetite that converts a mackerel into a salmon, and that is quite as well.

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Correspondence

Another Answer to "Questions for Millers."

MESSRS. EDITORS:—Having been a practical miller for twenty years, I noticed with curiosity the queries of "A Young Miller" on page 179 of the current volume of your valuable journal, and have looked with considerable anxiety for the answers. None appearing, I am induced to set forth my own opinions in the premises. The amount of draft necessary in the furrows of millstones is varied by the quality of stone, velocity of the same, amount of work to be done by said stone and the depth and width of the furrow. Generally, the draft should be about one inch to the foot—that is, for each foot in diameter of the stone, the end of the furrow nearest the eye of the stone should be one inch from the center of the stone. Having the furrows laid at this angle the draft will be increased by widening and deepening the furrows, and diminished by contracting their dimensions. For the particular stone of which "A Young Miller" speaks, I would prefer four inches draft, forty furrows, twenty long or leading furrows, and an equal number of short ones; shape of the furrows, straight, one and a half inches wide at the skirt of the stone, and one and one-eighth inches at the eye. The short furrows should enter the long ones at the center of the latter. The land or space between the the furrows should taper the same as the furrows—widest at the skirt. The bolt should clean six bushels per hour, if properly ground; two feet of coarse cloth would be useful to separate the shorts from the bran. Having had no experience with circular dress, I cannot decide whether it is better than straight; I think not. For information on this subject consult the "Miller and Millwright's Guide," edited by William C. Hughes, and published by H. C. Baird, Philadelphia. Said stone should be a trifle lower about the eye than at the skirt, just so that the staff will not touch it until within eight inches of skirt. Come, brother millers, let us hear from you.

N. SHOEMAKER.

[Our correspondent will observe that several answers have already appeared in these columns in reply to the queries of "A Young Miller;" but we shall be happy to make room for any additional letters throwing light on the subject.—EDS.

Gypsum and Salt in Pennsylvania.

MESSRS. EDITORS:—I notice an article in the SCIENTIFIC AMERICAN of April 5th, signed by "F," of Cincinnati, in which he corrects a statement made in your paper, where you asserted that Michigan is the only state in the Union that furnishes or contains coal, salt and gypsum. "F" says that Ohio also furnishes these articles in great abundance. Were you aware that in this county of Susquehanna gypsum has been found, and that too of a very good quality? If not, I would inform you that gypsum has been, and is, found at Great Bend, only eight miles from this place. The Indians also made salt from springs within a few miles of us; a fact that can be testified to by many living witnesses; and yet no one has had the perseverance or intelligence, thus far, to follow up the inquiry as to the places where the wells or springs are from which the Indians procured the water. We have also in our immediate vicinity other minerals, surface indications and specimens of which have been found in abundance, and I am getting together a collection of specimens of iron and other ores, quartz rock, stratified rock, metamorphic rock, &c., which are even now in sufficient quantities to convince the most incredulous of the existence of valuable minerals in this place.

P. W. RAFTER.

Susquehanna Depot, Pa., April 2, 1862.

Anchor Ice Again.

MESSRS EDITORS:—Allow me to say a word about anchor ice in answer to your correspondent's request. I can speak only from observation. We have plenty of it here. The water runs over a rough rocky bed about ¾ of a mile on a descent of about 12 feet to our mills at the top of the Falls. (The whole hight of the Fall is sixty-five feet). In this shallow bubbling course the anchor ice is formed by contact with the air. Its temperature is brought down below the freezing point, the spray and little jets, as they are thrown into the air, are literally frozen, when falling back into the water, which is too cold to melt them. they become a moving mass of curdled water, or, like snow and water, sticking to anything with which they come in contact. This is the view which I hold of its formation instead of its generating on the bottom as many claim. It often gathers upon the rock under a foot or more depth of water running at a very great velocity. It generally forms in the night, but is often seen on cloudy days when the thermometer is at about 10° to 12°, but like the dew it vanishes in a bright sunlight. P. H. WAIT.

Sandy Hill, N. Y., April 7, 1862.

Flax Culture and Machinery.

MESSRS. EDITORS:—It has become an important question for our country, whether flax culture in the Northern and, more particularly, the Western States, could not be brought to rival the cotton culture of the South if machinery were invented for cleansing the fiber and spinning and weaving it, equal to the machinery used for cotton.

According to the history of cotton growing in the South it appears that the invention of Whitney's cotton gin and the natural adaptation of the soil were the two great causes which led to the present very extensive cultivation of cotton. This was about the beginning of the present century, when flax was considered a very indispensable crop among our farmers, but its linty product has since been superseded by the cotton of the South perhaps only through the invention of the cotton gin. We certainly have a soil in the West which will produce of clean flax 100 lbs per acre more than the best cotton lands of the South can of cotton, and with much less labor, if we except the breaking, scutching and hackling, which should be performed with machinery. In England, the spinning and weaving of flax is now accomplished by machinery with a rapidity little short of the spinning and weaving of cotton, so that there would at once be a foreign market if the raw material were raised by the farmers of the great West. A machine that would perform for the flax grower of the West what the cotton gin of the South does for the cotton grower would be a great desideratum. E. L. WALKER.

Somerset, Pa., April, 1862.

Canal-Dredging Machines Wanted.

MESSRS. EDITORS:—I wish to otain a steam-dredging machine to be used on the Wabash & Erie Canal in Indiana, for the purpose of taking out sand bars, deepening and cleaning out generally, without drawing off the water. The canal is about forty feet wide on top, and three and a half to four feet deep. The machine to be so constructed that they can be used in shallow water, and so that the earth can be deposited by the machine upon either bank of the canal, or in scows, as may be necessary. I will contract for four or five such machines, complete and ready for immediate use.

Please put me in communication with some inventor or manufacturer of such machines. There is no difficulty in getting large machines, but my inquiries thus far have not led me to the kind I require for narrow canal and shallow water.

A. P. EDGERTON,
President Wabash & Erie Canal Co.

Fort Wayne, Ind., April 10, 1862.

Two "Suggestions to Inventors" Answered.

MESSRS. EDITORS:—A bird cage may be made with two bottoms, and slide one out as you push the other in.

Cannot a cask of sheet iron of small dimensions, 25 or 30 gallons, be made to hold petroleum by brazing the seam and brazing in the heads and corrugating the metal if necessary?

JOHN E. ATWOOD.

Mansfield Centre, Conn., March 25, 1862.

[Such iron casks are now used in England to export caustic alkali to the United States and other places.—EDS.

THE Chinese sent 82,000 ounces of gold from Australia in 1860, and 54,000 ounces in 1861. In the latter year 2,000,000 ounces were sent from Victoria to England.

Water from the Atmosphere.

A correspondent wishes to add to our list of suggestions to inventors, a hint to chemists to devise some mode of extracting water from the atmosphere for the use of our soldiers. There is an enormous quantity of water in the atmosphere, and it is being constantly taken out by natural agencies; all of our rivers being formed and fed from this source, but it is not probable that any considerable quantity will ever be obtained from the air by artificial means. The mode which most readily suggests itself is that employed by nature, and which consists in varying the temperature. A cubic foot of air at the temperature of 100° Fah. will hold 25½ grains of water in the form of vapor, but at zero it requires only ½ a grain to saturate the same volume of air. Consequently, if air at 100° is allowed to come in contact with water, each cubic foot will take up 25½ grains of water, and if the air is then cooled by being carried to the top of a mountain, 25 grains of the water will be deposited in the form of snow. The cheapest and easiest way to cool the air in Virginia or Tennessee would be by means of ice; but if the soldiers had ice enough for this purpose they would very quickly have an ample supply of water from the melting of the ice.

Water may also be collected from the air by means of substances for which it has a strong affinity, such as caustic lime, potash, salt, &c.; but it is more difficult to extract the water from these substances than it is to get it directly from the air. We, therefore, do not think the field a very inviting one, still it is not wise at this day to say that anything cannot be done.

Advantages of Early Vaccination.

The annual report of theVaccine Committee was read at a recent meeting of the French Academy, in which the question of early vaccination was fully discussed. M. Depaul, the reporter, states that in spite of the opposition raised to the vaccination of new-born children, the researches of the committee tend to show that this operation is not more dangerous in very early life than at the second or third month. In private practice, where the chances of variolous infection are much less than in the wards of an hospital, vaccination may, as a general rule, be delayed; but in the latter case such delays are dangerous, for, from one hour to another, cases of small-pox may be admitted. "If all children," continues M. Depaul, "were vaccinated within the first two or three days after birth, small-pox, already rare now in comparison with what it was formerly, would, we are convinced, completely disappear." This is an important subject for investigation by American physicians.

Complaints in Regard to the Overland Mail.

We make the following extract from a business letter just received from a California correspondent:—

"Our mail overland is very irregular. It is reported that the mails cannot carry all the newspapers, and that they are scattered all along the route, and very often made use of for the purpose of kindling the fire on a wet or stormy day. We Californians are heartily sick of the overland mail proceedings. I presume as much so as my North Carolina friends are of the rebellion. I wish, from the bottom of my soul, that the mail could again be carried by way of the Isthmus. I am fully satisfied that this would be a great improvement over the present state of the mail. Can not you push it through at Washington?"

We earnestly call the attention of Postmaster Blair to this subject. The mails to California are of the very highest importance, and should be managed with the greatest efficiency and fidelity.

THE COTTON MANUFACTURE IN ENGLAND.—The Manchester *Trade Report* of the 21st March says there is no revival in the demand for goods or yarns, and notwithstanding the reduced production and small stocks, the market is dull and inactive. The distress among those out of work is showing itself, however, more decidedly in an increased demand upon the poor rates, and the number of non-settled poor reported as having received relief this week is given at 9,200 persons, the largest number reported in any return that has yet been issued. In this respect Manchester may be taken as an indication of the state of the cotton district generally.

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GREAT CANDLE MANUFACTORY—DESCRIPTION OF THE OPERATIONS.

A correspondent of the London *Chemist and Druggist* describes the Sherwood Works, at Battersea, England, belonging to the celebrated Price Patent Candle Company. We have condensed the most instructive and interesting portion of this description for the benefit of our readers :—

The manufacture of candles upon an enlarged scale embraces a range of high scientific information. The art has been completely revolutionized within the past thirty years, and for this the world is chiefly indebted to the French chemist, Chevreul, who has now charge of the Royal Dye Works, at the Gobelin manufactory of tapestry carpets, in Paris. Chevreul patiently investigated the nature of fatty bodies, with the view of determining their relative value for illuminating purposes. He found that every natural fat contained substances which ought not to be present in candles, because such substances reduced their illuminating power. Thus tallow is composed of at least two distinct solid bodies, namely, stearic and margaric acids; also a liquid oil—oleic acid and glycerine—a sirupy body, which serves as a base to the three acids. Each of these acids, when burned in the wick of a candle or lamp, gives a more brilliant flame than the tallow from which they are derived, but the glycerine gives a flame which is exceedingly feeble. To obtain a good candle material the latter body must be removed from the fat; and as the presence of oleic acid renders the material soft and greasy, this substance must also be got rid of. Chevreul, in the year 1823, described a process by which the hard acids might be separated. From that time candle making has advanced with rapid strides, and what was once a rude and noisome trade has become a first class chemical manufacture. To appreciate the difference between the two phases of the art, we need only compare the common parlor candle of twenty years ago with that which now takes its place. The snuffy, guttering, feeble-flamed mold, formed of simple tallow, represents the mechanical stage of candle making, and is rapidly becoming a relic of the dark ages. Instead of it we find in general use, a hard, clean, polished cylinder, composed of beautiful chemical products, which burn away brightly by a slender and snuffless wick. Wax and sperm are still used as formerly, but to a limited extent. A new material, paraffine, has nearly superseded them.

At Price's Candle Works palm oil, cocoa-nut oil and Rangoon petroleum are used extensively for candles. The palm oil is solid, and comes in casks from Africa. These are emptied in a most expeditious and simple manner. The casks are rolled to a large shed, the floor of which is traversed from end to end with an opening about a foot wide, which is in communication with an underground tank. Over this opening the bunghole of each successive cask is brought, and a jet of steam is made to play upon the solid mass. The heat of the jet speedily melts the oil, which flows out of the bunghole into the tank, whence it is pumped by steam power to a large pipe, which conveys it to the distilling rooms.

The works cover eleven acres of ground; the distilling rooms are large one-storied buildings, with roofs of corrugated galvanized iron; no furnaces are used; no offensive smell is noticed, and all things look neat and clean, and very different from the filthy fetid candle works that formerly existed. Throughout the factory, steam, either at the common temperature or superheated, is employed as the source of heat in all operations connected with the separation and purification of candle material. The steam is conveyed to the different rooms by suitable pipes, and the smoke, dust and danger of the furnaces are thus kept at a respectful distance.

When the stearic candle manufacture was in its infancy the fat acids were separated from the glycerine by the process called lime saponification. The tallow was first boiled up with thin cream of lime, which seized upon the fat acids and caused them to forsake the glycerine; the soap of lime thus formed was then treated with sulphuric acid, which, by uniting with the lime, set free the fat acids. This was an expensive process, as to each cwt. of tallow 14 to 16 lbs. of lime, and 28 to 32 lbs. of sulphuric acid were employed; moreover, in the candle material, stearic acid, when obtained, was only in the proportion of two parts to five of the tallow employed, and the other product, oleic acid, had little commercial value.

The process of sulphuric acid purification, introduced into the manufacture about twenty years ago, was an immense improvement upon the lime process. It is still employed in these works, though to a comparatively small extent. The quantity of sulphuric acid now employed to decompose 1 cwt of fat, in some cases is reduced to 4 lbs., and even 3 lbs. Six tuns of the raw material, usually palm oil, are exposed to the combined action of concentrated sulphuric acid, and a temperature of 350° Fah. The result of this action is very striking. The glycerine is decomposed, and the fat is changed into a mixture of fat acids of a very dark color, with a very high melting point. This is washed to free it from charred matter and adhering sulphuric acid, and is then transferred to a still. When it is exposed to the action of steam the palm oil passes over from the still in a limpid stream, and the product is collected in clean cans, from which it is transferred to tubs. The acid action and the distilling operations separate a dark, bituminous-looking residuum from the pure fatty acids. The sulphuric acid process involves the loss of glycerine and a waste of material, owing to the decomposition of part of the fat acids. These defects induced the chemists of this manufactory to seek for a still more perfect process, and in 1854 such was discovered. This consists in passing superheated steam directly into the neutral fat, by which means it is resolved into glycerine and fat acids; the glycerine distilling over in company, but no longer combined with them. Glycerine, which was formerly looked upon as a nuisance, as something to be got rid of at a great expense, is now valued, and sells at a higher rate than stearic acid. The presence of this body in the tallow candle gives rise to the offensive odor of the snuff when the flame is extinguished.

To obtain the pure stearic acid which forms the beautiful white adamantine candles, the distilled oil is cooled in tubs. When it congeals it is placed in bags of cocoa-nut fiber, and subjected to hydraulic pressure in a room at common atmospheric temperature. In another building is a long line of heated chambers, in which the process of heating is completed. To these the piles of solid acid which have undergone cold pressure are carried, and by a second squeezing, together with the action of heat, every trace of oleic acid is removed from the material. The hard cakes of starric acid are now removed to large wooden vats, in which they are liquefied by steam heat, and the candle material is ready to be run into the molds. Cocoa-nut oils and all solid fats receive the same treatment for making pure stearic acid candles. Common candles are made from the product of distillation before it is subjected to pressure.

Paraffine is obtained for making candles from Rangoon (East India) petroleum, which is similar to that of the oil wells of America. This source of paraffine is much cheaper than the heavy oil obtained by distilling cannel coal. The Rangoon petroleum is a natural product of Burmah. It flows out from the ground like the Pennsylvania oil. It is treated to distillation in the Price Candle Works, and separated into different products, according to the temperature at which it is distilled. The most volatile liquid that passes over from the still at 160° Fah. is called Sherwood oil, and is really the benzine, so called, obtained in distilling American well oil. It is used for cleaning kid gloves, and for removing grease from silk and other fabrics. Oil for burning in lamps comes over, when distilled, at a higher temperature, then heavy oil for lubrication, at a temperature of about 550° Fah., and lastly paraffine, at 620° Fah. When cooled and solidified—by its temperature being reduced with ice—it forms the most beautiful known material for candles except white wax. In distilling this substance from petroleum, superheated steam is employed in order to elevate the retort to the proper temperature. Paraffine is subjected to pressure in the same manner as the solid fatty acid, obtained from palm oil and tallow. It is a beautiful white substance, and has a silvery luster. It is melted with steam heat, and run into molds in the usual way. In many cases great trouble has been experienced in removing stearic acid and paraffine candles, after they had become solidified, from their molds. In this manufactory a most convenient and ingenious method of removing them is employed. It is simply the force of compressed air. There are several large iron tanks, in which compressed air is forced by a steam engine; and these tanks connect with the machine in which the candles are molded. The candle molds are arranged in benches. Along the top of each bench there is a little railway, on which runs the "filler"—a car containing hot candle material. The wicks having been adjusted truly in the molds, the filler advances and drops in each mold the requisite amount of material. After a sufficient time has been allowed for solidifying and cooling, the boys who attend the machines proceed to remove the candles from the molds. It is in this operation that the compressed air is made use of. Each mold is connected with the reservoir, and on merely opening a tap, pop goes the candle, which is dexterously caught by the boy.

The candle molds and air pump constitute an immense air gun, containing a stock of several thousands of barrels, each loaded with a candle. The turning of a cock by boys in attendance lets off these guns, and ejects the candles with a slight hissing noise. This fusilade is going on all over the room, throughout the entire day, and in the course of ten hours no less than 188,160 candle projectiles, weighing upward of 14 tuns, have been shot forth.

Innumerable contrivances for drawing candles have been attempted, but none equal this, as the compressed air does not injure the fine polish of the molds on which the beauty of the candles greatly depends. The tops of the candles are downward when molded.

Eight hundred operatives, consisting of men and boys, are employed in this establishment. The wicks for the candles, and the cocoa-nut fiber bags are woven on the premises. There is a school for the boys, and a large space of ground alloted for them as a gymnasium. There is also a large swimming bath, and an excellent library.

Etching on Glass or Stone.

An important improvement in engraving by means of hydrofluoric acid has been made by MM. Jardin and Blancoud. Instead of acting upon the glass with the acid in a gaseous state, they employ it while liquid. They have sought to turn to account the remarkable properties of this acid in engraving hard siliceous stones, and have succeeded in producing, with the greatest facility, some very important artistic results. If a stone, upon which it is wished to to engrave a design, be coated with a varnish of wax dissolved in turpentine, after the drawing is made with a fine point, the hydrofluoric acid is poured on. Immediately a white vapor rises, which increases rapidly, and the proportion of which indicates the action of the acid. After a while, the duration of which experience alone can determine, the effect produced may be examined. If the engraving is satisfactory, the varnish may be removed; if the contrary, the action of the acid must be repeated as often and as long as may be necessary. In many instances it may be necessary to complete the action of the acid by the graving tool, in order to secure an artistic result. For ordinary engraving it is indispensable, as in the execution of a line engraving, or an engraving upon lithographic stone, not to prolong the action of the acid more than absolutely necessary, else the siliceous stone will become corroded all over, and so destroy the design. At other times, on the contrary, we can take advantage of this corrosive action to produce certain useful effects, permiting us to realize valuable results in an artistic point of view.

Every natural or artificial substance containing silica, and consequently attackable by hydrofluoric acid, is susceptible of being treated according to the process of MM. Jardin and Blancoud. When the action of the acid is concluded, the lines may be filled with colored materials, metals, &c., and a kind of damascening obtained which presents a new resource in the ornamental arts. Various kinds of porcelain, transparent or opaline glass, may be treated by this process with very novel and tasteful results.

RETURN POSTAGE.—Correspondents who write to us for information, expecting an answer by mail, should always inclose a postage stamp to prepay our reply. Our correspondence is very large, and it costs us from $5 to $7 per day to pay postage. If our correspondents would bear their own postage expenses it would relieve us of a large tax.

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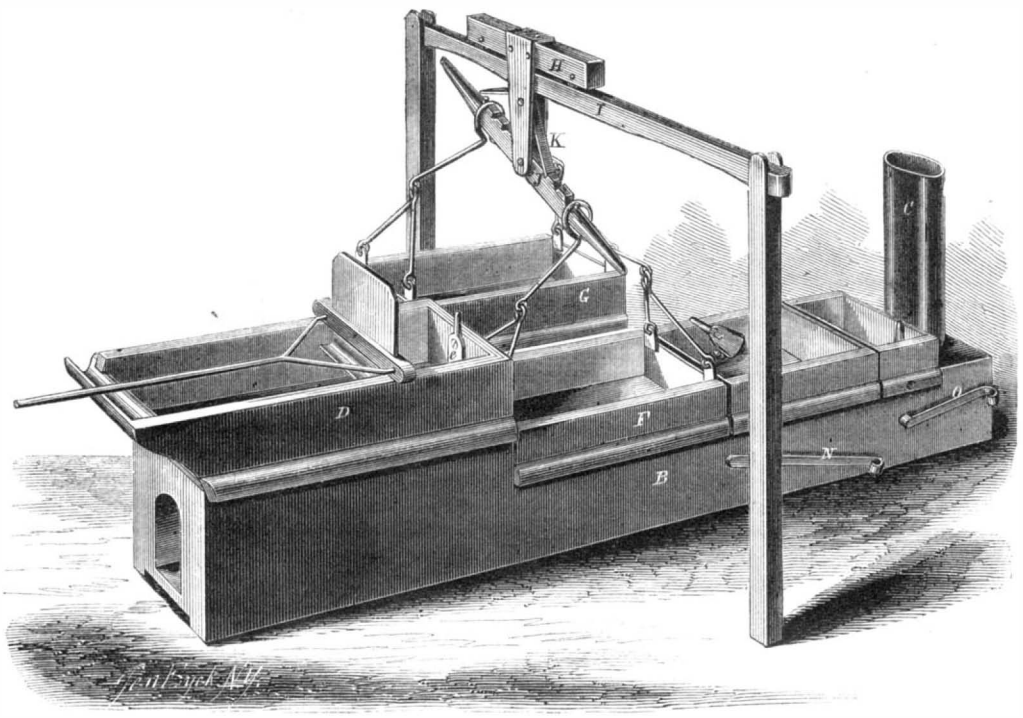
Improved Evaporator.

The extensive introduction of the culture of Chinese sugar cane, has created a large demand for apparatus for making sugar and molasses from the juice, and has stimulated inventors to make improvements in this apparatus. The accompanying engraving illustrates an arrangement of furnace and pans devised for the purpose of conductiong the evaporating process, by which the watery portion of the juice is expelled from the saccharine portion, with great economy of labor and in a manner to produce a superior article of molasses.

The inventors state that experience has shown that when the sirup has been boiled down to a specific gravity corresponding with about 20° or 30° of Baume's scale, if it is then allowed to cool at rest, the gummy portion of the juice will be precipitated, and will fall to the bottom; but if the boiling is continued, the gum will become so mingled with the molasses that it cannot be separated, imparting to the molasses a disagreeable acid flavor. This apparatus is accordingly designed to enable a pan of juice to be easily taken from the fire when the proper degree of evaporation is reached, and to allow it to rest till the gum is deposited, when the sirup is drawn off into another pan where the evaporation is completed.

TUFTS'S EVAPORATOR.



The fire is made in the furnace, A, and the smoke passes through the horizontal flue, B, and out of the chimney, C. The juice is first poured into the pan, D, where it is heated to the boiling point. The gate, *e*, is then opened and the juice is drawn into the pan, F, through a suitable spout. This pan rests over the flue where the heat is less intense than it is directly over the furnace, and where, consequently, the sirup is in less danger of being burned. Here the boiling is continued until the juice is about half evaporated, when the pan is raised from its seat and carried to one side of the flue, while another precisely similar pan, G, is brought into its place and filled with a fresh supply of juice from the pan, D, in order that the work may go on without interruption.

To facilitate this changing of the position of the two pans, F and G, they are suspended from a carriage, H, which runs on rollers upon a cross beam supported over the flue by upright posts at its ends. As the pan must be raised from its seat before it is carried to one side, the pans are hung upon a vibrating lever, J. A brace, K, holds the lever, J, either in a horizontal or in an inclined position, as may be desired.

After either of the pans, F or G, is emptied, it must be very carefully cleaned before receiving a fresh supply of juice, and the pan, M, is provided for heating water for this purpose.

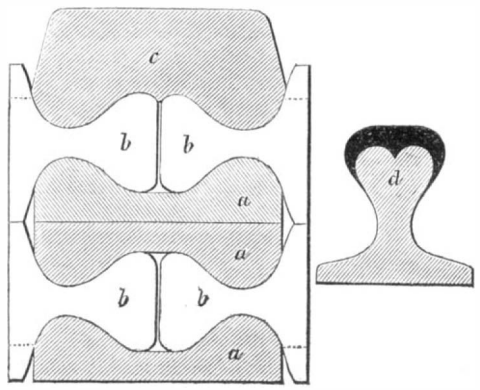
The upper part of the flue is left open to be closed by the pans, F and G, so that the smoke may come directly in contact with the bottoms of these pans; but provision is made for turning the smoke down away from immediate contact with the pans in case the heat should be too great. This is effected by introducing two sheets of metal of the same width as the interior of the flue and of the same length respectively as the pans, F and G. The sheet under the pan, F, is fastened at one end to a rock shaft, the end of which is brought through the side of the flue and has the lever, N, secured rigidly to its extremity. By carrying the loose end of this lever up or down, the metal plate is tipped so as to conduct the smoke either upon its upper or under side, thus directing the heat against the bottom of the pan or shielding the pan from its action as may be desired. The metal sheet under the pan, G, is connected in like manner with the lever, O.

The scraper in the pan, D, is provided from drawing out the scum which rises in this pan, the trough at the end of the pan greatly facilitating the operation.

The patent for this invention was granted, through the Scientific American Patent Agency, March 11, 1862, and further information in relation to it may be obtained by addressing the inventors, M. and S. G. Tufts, at Maineville, Ohio.

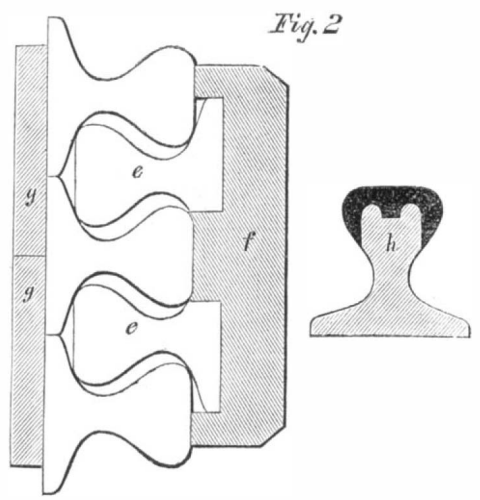
PERRY AND ONIONS'S MODE OF FAGOTING RAILS.

Fig. 1



One large item of expense in operating our railroads is the renewal of the rails, the ends of which are battered by the concussion of the wheels. The usual mode of renewing rails is by sawing them into short pieces, which are piled up in bundles or fagots,

Fig. 2



heated to a welding temperature, and re-rolled. The accompanying engravings represent an improved method of piling the old rails to produce in the new rail a more solid face than has been obtained heretofore.

Fig. 1, illustrates the plan for forming a pile of 4 rails. Three bars of iron are rolled in the form shown at *a a a*, and are piled with the rails, *b b b b*, in the manner represented. Then a bar of iron or steel of the form indicated by the shaded section, *c*, is placed upon the top of the pile, when the fagot is ready for the furnace and rollers. The first passage through the rollers crushes the flanges into one another to the dotted lines. Then the old rails are all worked into the interior of the mass to make the stalk of the new rail, while the top and bottom bars come into positin to form the head and flange—the parts which it is most important to have sound and free from fibrous structure.—The cross section or end of the new rail is represented at *d;* the darkly-shaded head showing the part formed by the bar, *c*.

Fig. 2 illustrates the mode of forming a pile of 5 rails; two of which, *e e*, are made up of the short pieces left from the saws and shears, with about an inch sheared from one of the flanges to make the pieces fit into the pile. This pile is passed 9 times through the rollers, the first 4 times on edge in the position represented. The head is formed by the piece, *f*, and the flanges by the pieces, *g g*. The pieces, *g g*, may be of equal or unequal widths, or they may be combined in one piece 10 inches wide. The end of the rail formed by this pile is represented at *h;* the darkly-shaded part showing the portion formed by the bar, *f*.

This mode of piling rails was designed by William Perry and William Onions, both of St. Louis, Mo. Steps have been taken to secure the invention through the Scientific American Patent Agency, and further information in relation to the invention may be obtained by addressing William Perry, at St. Louis.

CLOTHES WRINGERS—SQUEEZERS.

The little machines which are now so extensively employed for pressing the water from washed clothes are composed of two small rollers, covered with vulcanized india rubber, and set one above the other in adjustable spring bearings. Being geared together by pinions, they carry the clothes through and between them, when they are revolved, and thus press out the water. This class of machines have been used in calico-print works and bleaching establishments for a century, at least, and are called "squeezer rollers." Being employed to press the water from long pieces of cotton the rollers are made of wood, covered, in some cases, with several thicknesses of cotton cloth. Of course, such rollers are not suitable for pressing body clothing, because they would crush the buttons and the hooks and eyes of shirts and frocks; hence the use of vulcanized rubber, which, being elastic and moderately soft, is a great improvement for the covering of such rollers.

Wringing machines are different in their construction from squeezers. They are made so as to embrace a wringing or twisting motion. They generally consist of a revolving hook attached to a crank handle at one end of a frame, and this hook is connected, by an open bag of coarse linen, to a stationary ring situated on a post. The washed clothes are placed in this bag, and the hook is revolved. This action twists the bag and wrings the clothes. For wringing cotton yarn no bag is necessary. The hanks of yarn are placed over a stationary hook at one end, and a revolving hook at the other end of the frame. Such machines are also employed in some bleach works, and have also been attached to some of our washing machines. They are not so convenient for domestic purposes as the squeezers with vulcanized-rubber rollers for small articles, but are perhaps better suited for blankets and such like large articles.

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NEW YORK, SATURDAY, APRIL 26, 1862.

CLASSES OF IRON-CLAD WAR VESSELS.

The construction of mail-clad war vessels is a subject which has engaged the attention of the leading naval powers of Europe for the past seven years, and it is now a topic for intense thought among war people. It has been stated that the combat between the *Monitor* and *Merrimac* first settled the question practically with our government naval authorities respecting the superiority of mail-clad over wooden vessels. This may be so, but, in our opinion, it was just as clearly determined by our river iron-plated gunboats in the attack on Forts Henry and Donelson. In Europe this question was practically settled during the Crimean war by the successful attack by the French plated gunboats on the Fortress of Kinburn, and the result of this action has led to the construction of powerful iron-clad vessels by both France and England. As a large sum has lately been appropriated for the construction of a number of mail-clad vessels for our navy, indubitable evidence is thus afforded that we, with all the other leading naval powers, have concluded to build none but iron-clad war vessels hereafter. But as in the days of old, when different armies went forth to battle, in coats composed of scale and chain armor, and plates riveted together in various forms, so now there are as many different plans, not only proposed, but actually carried out into practice in the construction of armor-clad war vessels. First, there is the system of covering wooden frigates, like *La Gloire*, with thick iron plates; second, the construction of frigates, like the *Warrior*, with an inner skin of iron plates, a backing of wood planking, and 4½-inch outside plates. In almost every other respect, excepting the iron plating, these two classes are similar in construction and form to old razeed wooden steam frigates; hence they constitute one class, to which the new frigate *Kensington*, now building in Philadelphia, belongs. A third class is that of the celebrated Stevens Battery, which has water-tight compartments that are capable of being filled with water, to sink her nearly to the water's edge during an engagement. It was planned chiefly for effective harbor defense. Fourth, the system of the *Monitor*, the chief feature of which is the revolving iron gun tower placed amid ships—also intended principally as a floating battery for harbor defense. Fifth, the system exemplified in the *Galena*, now building at Greenpoint, with overlapping rail plates secured to oak planking. It is intended for a shell-proof gunboat, and is otherwise of the *La Gloire* class, adapted for sea as well as harbor duty. The sixth is the plan of Capt. Coles, of the British navy, which is similar to that of the *Monitor*, having revolving gun turrets placed amidships, combined with an iron hull of light draft and good model, and is adapted for sea voyages as well as harbor defense. Seventh, the system adopted for our Western river paddle-wheel gunboats, embracing iron plates of moderate thickness secured to wooden frames. Eighth, the system of angulated iron plating adopted for the *Merrimac*, and intended to deflect the shot. This has been called "Jones's angulated-plate system,'' but it is rather a mode of arranging the plates than a distinct system, as it has been applied to our Western gunboats, and may be used on almost every plated vessel.

The brief analysis thus presented of several orders of iron-clad vessels teaches us that no particular system has been fixed upon as best adapted for all purposes of warfare, or for such general service as the old wooden vessels. As regards our river gunboats, experience alone can determine how to build them in the best manner for their peculiar duties, but an iron-clad war vessel for sea service, according to our notion, should not only be as impenetrable to shot as it is possible to make it, but it should also be a good sea boat, possess a high speed, and be as well adapted for offense as defense. Some of the foregoing systems do not embrace all these qualities, but it is possible that some one system may be devised and compounded out of the whole, so as to produce superior war vessels to any that have yet been built or proposed.

SHOT AND GUNS—PENETRATION AND CONSTRUCTION OF WAR VESSELS.

It has been said that the genius of man will always be capable of inventing offensive weapons, such as more powerful guns, or peculiar shot, to nullify all the benefits proposed for iron-plated vessels. Thus it is said that flat-headed steel bolts have perforated the thickest iron plates yet made for war vessels; and wrought iron round shot fired from 68 pounders have achieved like results. It is also evident that the Secretary of our navy believes that very large shot, such as that fired from 20-inch guns, will be able to crush in the sides of iron-plated frigates as he has recommended several guns of this caliber to be cast. It is not, however, from shot that the greatest danger is to be apprehended, but from shells, and it is well known that plates of three inches in thickness can resist these; hence the necessity for and the utility of iron-plated vessels. We are also skeptical respecting flat-headed steel bolts and wrought-iron round shot penetrating a properly constructed iron-plated ship. The plates which have been penetrated with such shot were not properly backed up, and to this important feature the attention of our naval authorities should be specially directed. The character of the material which should be used for backing plates, and the requisite thickness of it, are just as important considerations in the construction of mail-clad vessels, as the quality and thickness of the iron plates. The resistance to penetration increases with the thickness of the material, and to penetrate any body, the whole of the material in the line of the direction of the shot must be displaced. We have perforated an unsupported sheet of iron with a leaden bullet, but the same sheet, when firmly supported on a five-inch oak plank was only indented with a similar charge and bullet.

One objection to the frigate class of vessels, like the *Warrior* and *Kensington*, is the great weight of their guns, two sets being required for the two broadsides. One pivot gun answers the purpose of two broadside guns, but then it can only be used on deck, whereas the great benefit of iron plated vessels is the casemated protection afforded to the gunners. In the revolving gun towers placed amidship, such as that on the *Monitor*, and according to Capt. Cole's system, the advantages of pivot guns with perfect protection for the gunners are secured. This system, or a modification of it, appears to us as deserving more particular attention. Vessels of good model, a moderate draft of water, and possessing good sea-going qualities may be constructed with revolving gun turrets. All the kinds of iron-clad war vessels mentioned may be constructed on the ram principle. The efficiency of a marine ram is in proportion to its mass, its strength of hull and the power of its engines. These three conditions should not be forgotten.

Although the superior crushing power of large shot is well known, several objections may be urged against very large guns, such as their great weight, the Rodman 15-inch gun weighing 25 tuns, while a 68 pounder weighs only five. Large guns also require very large ports, and besides they are not so strong in proportion as smaller guns, and cannot therefore be used with such large charges of powder to give shot a high velocity and great penetrating power. For firing shells, their superiority is unquestioned, but round shells are useless against iron-sides. But is it not possible to make elongated steel shells with flat-fronted solid heads, capable of cutting into and perforating iron-plated vessels? If so, they will prove most destructive missiles. This is a suggestion which we throw out for consideration and experiment. The whole subject is fruitful of thought and investigation for our naval constructors, engineers, inventors, engineers of artillery and manufacturers of iron plating.

That portion of the hull of an iron-clad vessel which lies under the water line, is considered by many persons to be quite vulnerable on account of the comparative thinness of the plating. The blow from a powerful steam ram striking a few feet under the water line, in all likelihood, would sink an iron plated vessel, but we think that no shot will penetrate the hull four feet below the surface—the distance to which the thick plates descend. Torpedoes, submarine guns, &c., have been proposed for operating on war vessels under the water line, but hitherto all such contrivances have been very uncertain in their action. One ingenious and peculiar feature of the *Monitor* deserves praise, we mean her strong and impenetrable guard-rail near the water line. It was this part of her hull, which saved her from being cut down by her giant antagonist, the *Merrimac*.

CASHMERE SHAWLS—THEIR IMITATION.

A statement has been very widely disseminated that M. Voisin, of France, has lately invented an improved loom in which shawls are woven in such a manner as to rival the famous products of Cashmere. It is stated that this result is obtained by a peculiar interlacing of the threads. With respect to the invention, the Paris correspondent of the London *Photographic News* says:—

This discovery must not be looked upon in the light of an experiment, for no less than 1,650 shawls have been made on the new plan, and worth 350,000 francs, equal in quality and appearance to Cashmere, valued at 1,250,000 francs. We may expect to see in the forthcoming exhibition not only specimens of these shawls, but of other new fabrics produced by the machine of M. Voisin.

Though the cost and fame of the Cashmere shawl are doubtless principally due to the mode of weaving it, they result also, to some extent, from the rare material of which it is made. This is the product of the Cashmere goat, and is much finer and softer than the finest Saxony wool. The goats are raised on the high table lands of Tartary where the cold is very intense, and to protect them against its chilly influence nature has provided them with an outer coat of long silky hair and an under coat of warm soft woolly hair, called *Pashai*; the latter is the material of which the Cashmere shawls are made. It is brought down regularly from the Tartar shepherds to Cashmere by merchants, who sell it to the shawl makers. It is first washed with native soap to free it from grease, then it is dyed the various colors required. The Orientals rival the most civilized nations in the production and combination of colors in shawls. The patterns of these shawls are all first drawn upon paper with great care, and the weaver must work out the design to the best of his ability. The looms used are the common East India kind, and the weavers are all males; each man sits with his little bundles of colored wool wound upon small spindles at his side, and the paper pattern before him with the design drawn in colors. By this he is guided as regards the number of threads of each color to put in. The pattern is woven in strips about eight inches in length and four in width, and a certain number of these are afterward washed, dried, pressed and stitched together by the needle to form a shawl of the required size. The uniting of these several small woven parts is done by females, who acquire such skill in the art that a seam cannot easily be detected, the stitches being the same in form as those produced in the loom. The "shawl darners'' of France and Scotland are equally skillful with the needle. They darn the small cuts that are frequently made in new "harness shawls,'' and none but connoisseurs can detect the work of the needle in them.

In designing patterns and weaving shawls, the French undoubtedly surpass the natives of Cashmere, but unless M. Voisin employs the fine under-wool of the Tartar goat as his shawl material, we do not think he has made a commendable imitation of the Cashmere shawl.

NAMES ON MODELS.—Inventors who send us their models should not fail to put their names upon them, as for the want of this simple precaution we are sometimes unable to find out their origin, which is very perplexing.

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NEW CARTRIDGES AND SHOT.

Mr. S. Franklin Schoonmaker, a theological student in this city, proposes to make cartridges for large guns with two or more chambers, for the purpose of relieving the guns from excessive strain at the instant of discharge. The cartridge is to have its chambers separated by perforated metallic plates to divide the full charge of powder and start the shot under a lower pressure than when the whole charge of powder is packed close together. Perhaps this idea is worthy of further investigation, although the ignition of all the powder, even with such cartridges, must be almost instantaneous.

Mr. I. W. Shaler, of Brooklyn, has left us samples of his sectional conical bullets and new cartridges—which do not require to be torn in opening. The bullet is divided into three sections, each a hollow cone, the one fiting into the other, so as to form one long conical bullet in the cartridge. The object of such bullets is to use them in the musket rifle and obtain the accuracy and range of the rifle, with one of the cones, while the other two separate and at a a certain range "kill three at a blow." Experiments have been made with such bullets at Washington, and an order has been given for a large quantity for the army. For firing upon close columns they will be very destructive. The cartridge attached to this bullet is opened by drawing a small piece of cord that is twisted into it. It neither requires to be bitten by the teeth, nor torn by a knife, or the sharp edge on the rifle.

Compressed Gunpowder.

The following we extract from "Well's Annual of Scientific Discovery" for 1862, just issued by Gould & Lincoln, Boston, on the subject of compressed gunpowder :—

The idea has been suggested by Prof. R. O. Doremus, the well-known chemist, of New York, that gunpowder for projectile purposes may, in most cases, be used with as great advantage in the form of compressed cylindrical cakes as in grains; and experiments instituted under his auspices by ordnance officers of the U. S. Army, have given most satisfactory results. Most persons would unhesitatingly assert that gunpowder compressed in a hydraulic press, to a consistency so hard as to resist fracture on being struck violently, would burn when ignited in the manner of a fuse or slow match. Such, however, is not the case, as the compressed cake explodes on the application of fire with apparently as great rapidity as loose grains. The idea of using compressed powder, if found practically available, is one of the most useful of recent improvements in military science, inasmuch as it entirely obviates the necessity of a cartridge—either cannon or musket—reduces the bulk of the powder two-thirds or more, and saves the waste consequent on transporting and handling powder in grains.

From the above the reader would suppose that the compressing of gunpowder into solid cakes or cartridges was a new invention, but on referring to the London *Mechanics' Magazine*, page 306, Vol. III., new series, we find the claim of J. H. Brown, patented October 15, 1859, which reads as follows :—

2,357.—J. H. Brown. Improvements in the Preparation of Gunpowder for Loading Ordnance and Firearms. Dated Oct. 15, 1859.

The patentee claims combining and compressing grains of gunpowder, with an adhesive solution, into solid cakes or charges for loading ordnance and firearms. Patent completed.

On the 21st of May, 1861, Robert Bartholomew, of the U. S. Army, obtained a patent for compressed cartridges of powder, the latter being composed of nitrate of potassa, 75 parts; charcoal, 12; sulphur, 10; chlorate of potassa, 3. These ingredients (in powder) are incorporated with collodion, &c., and finally coated with collodion.

It would seem, therefore, that whatever merit may be attached to Prof. Doremus's discovery, the idea of compressing gunpowder is not of very recent origin, and if it is of the practical importance which has been claimed for it it is surprising to us that it has not come into more general use.

Petroleum in London.

The Insurance Companies in London, like those in New York, have become alarmed at the large quantity of well oil at present stored in the British metropolis. These companies have laid their grievances before the Mayor, and they assert that this oil is of a most inflammable and dangerous character, being liable to spontaneous combustion. It is said that there are about half a million of gallons of such oils now stored on the wharves in London. As crude petroleum is more dangerous than the refined quantities, and as the cost for carriage to market is just the same for both, it would be well to refine all petroleum in the vicinity of the oil wells.

Mail-clad Vessels and American Guns Discussed in Parliament.

By the latest news from England we learn that on the 2d of April, in the House of Commons, Sir F. Smith called attention to the engagement between the *Monitor* and *Merrimac*, and urged the consideration of future prospects of defensive warfare. He argued in favor of small vessels like the *Monitor* in preference to stationary forts, and advocated the cessation of work on fortifications, and the construction of iron gunboats or batteries instead.

A general debate ensued, most of the speakers opposing outlay on fortifications.

Sir G. C. Lewis and Lord C. Paget, on behalf of the Government, warned the House against hasty action, and the enormous expense this revolution in naval warfare would entail. They questioned whether the *Merrimac* and *Monitor* had thrown any new light on the subject, and thought forts could be made to maintain their superiority. They believed artillery could be made to crush these iron vessels. It would not do to proceed hastily, without further experience, but the government would watch the question carefully.—The subject dropped without action, but Mr. Bernal Osborne gave formal notice of a motion that it is expedient to suspend the construction of forts at Spithead until the value of iron-roofed gunboats for the defence of ports, shall be fully considered, and Lord Bentinck moved an amendment to Mr. Osborne's resolution declaring it inexpedient to proceed with fortifications, to the effect that the government be empowered to apply the money voted for fortifications to the construction of iron sheathed vessels.

The *Morning Post* calls attention to the improvements America is making in ordnance, the weight of the shot thrown by the *Monitor* being nearly double that used on board any of the British ships.

The construction of entire wooden vessels in all the English dock yards has been suspended.

New Mode of Copying Engravings.

The Paris correspondent of the *Photographic News* say :—M. Brettiger suggests a very simple method of reproducing by chemical means an engraving from a steel or copper plate. Dissolve in 1,500 parts of pure water 16 parts of pure, concentrated sulphuric acid, and to 200 parts of the mixture add ½ part of iodide of cadmium. This last mixture is poured into a dish, and the engraving is immersed in it, and left till it has become thoroughly impregnated with the liquid, it is then placed upon folded sheets of white blotting-paper, on a plate of glass, and the excess of moisture removed from the engraving : it is then placed printed sides downward upon a sheet of writing or of positive paper, and placed in a press. An impression is obtained as delicate as that furnished by photographic processes. The iodide of cadmium may be replaced by iodide of potassium. The reproduction is due to the reduction of the iodine by the Frankfort black in the ink of the engraving, and the liberated iodine acts upon the starch with which the paper is sized. The engraving will give a second impression without being returned to the solution. When the engraving has been used several times, it is only necessary to wash it in water to remove the spots that may have formed. Lithographs and ordinary printed matter cannot be reproduced by this process, on account of the nature of the printing ink, but writing ink succeeds very well. Unfortunately, these beautiful impressions become blew all over, and are gradually effaced, even if covered with a coat of varnish.

Our Naval Authorities.

Our respected cotemporary the *Evening Post*, in alluding to the successful raid of the *Merrimac*, at Hampton Roads, characterizes it as "the result of negligence in not having long since taken Norfolk." This desirable object might have been achieved with comparatively little sacrifice of life but for the imbecility of the naval authorities in not earlier advising the construction of iron-clad gun boats. If the Naval Constructor's Bureau had recommended the building of Donald McKay's battery, Norfolk would have been in possession of the government three months ago. Oh for a change in our Naval Department! Let us have live, progressive men to manage it and all will go well. So long as the *Merrimac* is afloat our navy is in disgrace.

Remarkable Boiler Explosions.

We have received a communication from a correspondent, with a diagram of the Maryland Blind Institute, in Baltimore, describing the explosion of a steam boiler, which took place in the bake house of that establishment on the 31st ult. The boiler was an upright, 10 feet long and 4½ feet in diameter, and had a conical firebox. The space between the crown sheet and the top of the boiler was between three and four feet. The boiler exploded inward, and the conical firebox was torn crosswise near the top. This boiler rose entire from the boiler room, and took a diagonal direction from the place where it was situated, and was projected to the distance of 100 feet, and to a hight of 50 feet above the main building. When it had reached this hight (about 150 feet) several witnesses testify that it exploded again, and took a direction parallel with the north wing of the building, and finally fell through the roof end of the wing, breaking a hole about 10 by 20 feet, and lodging on the top floor, in a school containing seventy boys, killing two and wounding seven. Our correspondent states that there was an explosion when the boiler reached 50 feet above the main building, but there was no explosion in the boiler room, he believes. He says the boiler must have been raised from its seat by the action of some other force than the steam, and inquires what was it? He states that a similar and peculiar explosion took place several years ago at Rogers, Ketchum & Grosvenor's locomotive works, Patterson, N. J. A new locomotive had been blocked up on the floor, for the purpose of trying its machinery. The water in the boiler was allowed to get too low when there was a strong fire in the box. The engine jumped entire straight up through the building, and tumbled over on the peak of the roof, with the smoke stack hanging over the gable end.

In our opinion the water in the Baltimore boiler was suffered to fall below the crown sheet of the firebox. The latter became red hot and was fractured, and the steam came in contact with the fire, its great force then acted upon the top end of the boiler, projecting it upward like a rocket. The second explosion of this boiler is not so easily explained.

The projection of exploded steam boilers entire from their fixed positions is not uncommon. A vertical boiler, 21 feet long and 9 feet in diameter, exploded in this manner in the Manchester District, England, in the month of February last. It flew straight up through the roof of the building to a great hight, then it was struck with a strong gust of wind and carried a considerable distance out of its former course. Six persons were killed by this accident, and the cause was undoubtedly the same as that which resulted in the explosion at Baltimore.

The Iron-clad Frigate Kensington.

This iron-cased frigate, which is now building at Philadelphia, by Messrs. Cramp & Son, is progressing rapidly. There are nearly five hundred hands engaged upon her, and the first row of plates has been put on. The plates extend beyond the beam for about five feet and form a formidable ram. These plates are each 15 feet long, 28½ inches wide and 4½ inches thick (we understand). They are made at Pittsburgh, and are tongued and grooved like those of the *Marion*. She will be 3,500 tuns burden, and be in all respects, a first class, small, iron-clad frigate. Her sides will be perfectly smooth, and present an angle of 30° to the enemy's shot. It is not expected that she will be ready for launching within two months.

WEIGHT OF CANNON.—A navy 64 pounder weighs 184 times as much as one of its shot. The English wrought-iron 13-inch gun, of Horsfall's, is 170 times heavier than its shot. The Rodman 15-inch gun weighs 150 times more than its shell, and 114 times more than its solid shot. The projectiles fired by the *Monitor* were 11-inch shells, with a small cavity, and very thick walls, weighing 169 lbs., and 93½ of them weighed as much as the gun. It is laid down as a general rule that a cannon should be at least 100 times heavier than its shot.

SHEEP IN CALIFORNIA.—A correspondent of the *Pacific Sentinel* estimates the number of sheep in California at 2,000,000, and the average amount of fleece on each at three pounds, giving an annual wool crop of 6,000,000 pounds, with a rapidly increasing tendency.

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RECENT AMERICAN INVENTIONS.

Furnace for Roasting Ores.—This furnace is more especially intended for desulphurizing and oxydizing or calcining iron pyrites, copper pyrites or other sulphurets, or for calcining other auriferous substances. The object of the invention is to apply the heat uniformly, or as nearly so as practicable, throughout the whole body of the material upon the sole, bottom or shelf of the furnace, and, while permiting the combustion of as great a portion as is desirable of the liberated sulphur, to prevent the combustion of a sufficient portion of it to produce such an intense heat as will cause the fusion or agglutination of the material. Invented by R. B. Norman, of Sacramento, Cal.

Pianoforte Action.—In all the best pianoforte actions there is what is variously known as the "repeating lever," "repeat spring," "repeating device," "repetition movement," &c., that is to say, a device or mechanism by which the hammer, after striking, is arrested in or brought to a position very near the string, and there so supported that, by a very slight rise of the playing end of the key the jack may be allowed to fall into its operative position. In the actions heretofore constructed this device or mechanism is commonly either carried by the jack or in some way connected therewith or dependent thereon for its operation. This invention consists in a mode of constructing and applying such device or mechanism by which it is made entirely independent of the jack, thereby not only making the said device or mechanism more free and yet more positive in its operations, but allowing the jack to operate with greater freedom and certainty, and giving a better "touch" to the action. Patented to Henry Steinway, Jr., of New York city.

Slide Oiler.—The object of this invention is to render self-lubricating the gibs and slides of steam engines or other machines having cross heads, or their equivalents, working in straight guides, and allow the oil employed in such lubrication to be used over and over again as long as may be desired, instead of of being thrown off from the slide and lost or wasted. It consists in the combination of a hollow gib or shoe and an oil reservoir at the bottom, or at each or either end of the slide, the said gib or shoe being constructed with suitable openings for the reception of oil from the reservoir or reservoirs and for the delivery of such oil upon the surface of the slide. Invented and patented by Tisdale Carpenter, of Providence, R. I.

Governor Connection.—This invention, by Tisdale Carpenter, of Providence, R. I., relates to the application of the governor to lengthen and shorten the arms of rocking levers by which the induction or cut-off valves are worked, and thereby to cause the said levers to be capable of receiving from the cam or other device employed to impart motion to it from the main shaft of the engine, a motion which is variable in such manner as to enable the valve to be closed at an earlier or later point in the stroke of the piston of the engine, as may be required to effect its proper regulation. It is more particularly applicable in connection with the compound cam and rocking levers which constitute part of the subject matter of Letters Patent, No. 222, granted to the same inventor, dated Jan. 29, 1861. It consists in a peculiar mode of effecting the connection between the regulator and the shifting portions of the rocking levers which provide for the lengthening and shortening of their arms, the object to be attained being to prevent any unsteadiness of the motion of the governors produced in the shifting of the aforesaid arms of the levers.

SCIENCE AND BALLOONING.—The British Scientific Association has decided to patronize balloons, and last year appointed a "Balloon Committee," with a grant of two hundred pounds! to carry out experiments with them. The first experiment, made about five weeks ago, proved a failure, because the balloon leaked, and after ascending about half a mile came down in a thick coppice, breaking the delicate machinery used for taking observations, and seriously rightening but not hurting the "intrepid aeronauts."

A STEEL-suspension bridge of 110 yards span is now undergoing test at Birkenhead, England. The steel used in it stood a test of 70 tuns per square inch of tensile strain.

Specific Heat and Chemical Combination.

At a late meeting of the London Chemical Society, a paper was communicated by Mr. J. Croll, on the above subject, of which the following is the substance :—

After alluding to the opinion generally held with reference to the specific heat of compounds, compared with that of their component elements, namely, that a diminution took place during combination unless the resulting compound was a fluid, in which case the specific heat was increased, he stated that he had found this was not correct; for that the specific heat of compound gases and liquids was generally less, and that of solids more, than that of their component elements. A table of the specific heat of different bodies had been drawn up, from which it appeared that out of 94 solid compounds, the specific heat of 66 had been increased, and of 28 diminished, by combination; out of 28 gases there was an increase with 6, and a decrease with 22; while, out of 33 liquids, there was an increase in 12, and a decrease in 21 cases. In 14 cases the specific heat increased during the passage of the substance from the gaseous to the liquid state, and it was reduced in 11 cases while changing from liquid to solid. From this it was probable that the increase in the specific heat of a compound solid body above that of its elements did not depend simply on its being solid, but, on the contrary, that it was solid because its specific heat exceeded that of its elements. The following considerations would perhaps throw some light on the subject :—When any substance is heated, part of the heat is expended in producing expansion, and the other part in raising the temperature, and the sum of these two is equal to the specific heat. If a gas confined under a constant pressure is heated, it will be found to have a greater specific heat than if its volume be constant, the reason being that in the former case some of the heat is absorbed in producing expansion; for the heat cannot do two things at the same time, and that which produces the expansion cannot affect the thermometer. When heat is applied to a mass of ice the temperature rises to 32° and then becomes stationary; this is the result of the difference in resistance that the heat experiences at the two outlets, the greatest amount passing to that at which there is least resistance; hence the molecular force of a solid body must diminish as the temperature rises; at 32° the molecular force of ice cannot overcome the repulsive force. On heating a gas there is no loss from molecular influences, but with a solid, part of the heat is taken up in producing molecular changes, and therefore the less heat a solid contains the more does it resemble a gas in this respect, the specific heat increasing with the rise of temperature, from which it follows that the higher the melting point of a solid the less is the specific heat, which is experimentally found to be the case. In those cases of combination in which a change of one of the elements from a solid to a fluid state, or the contrary, took place, a change in the specific heat of the resulting compound could be accounted for. On the whole it would appear that the changes in the specific heat of bodies that occurred during combination were due not only to chemical action, but also to molecular changes; the real specific heat of an atom remaining probably the same under all conditions.

NEWLY-made cast steel, which has been found unfit for forging, is rendered workable by long exposure to the air or running water. This fact is known to practical workers in steel, who frequently act upon it, but the reasons why such a change is produced in the nature of the steel is unknown. It is not held to be decarbonization of the metal, but molecular changes in the metal.

TERRIFIC ROCKETS.—Lieut. Samuel Parlby, of the Bengal Artillery, states that it is perfectly practicable to produce rockets of 1,000 lbs. weight which can be thrown with equal exactness as shells from mortars. One of these falling upon the deck of a ship, he says, would immediately destroy it. They have a rotary motion like rifle bullets.

PROFESSOR THOMSON, of Glasgow, celebrated for his great knowledge respecting the operations of electricity, states that he usually finds the atmospheric electricity within doors negative to that of the earth. The air out doors is generally positive.

The Lead and Lap of Slide Valves.

The lead of the valve is the amount of opening the valve presents for the admission of the steam, when the piston is just beginning its stroke. It is found expedient that the valve should have opened a little to admit steam on the reverse side of the piston before the stroke terminates, and the amount of this opening, which is given by turning the eccentric more or less round upon the shaft, is what is termed the lead.

The lap of the valve is an elongation of the valve face to a certain extent over the port, whereby the port is closed sooner than would otherwise be the case. This extension is chiefly effected at that part of the valve where the steam is admitted, or upon the steam side of the valve, as the technical phrase is; and the intent of the extension is to close the steam passage before the end of the stroke, whereby the engine is made to operate to a certain extent expansively. In some cases, however, there is also a certain amount of lap given to the eduction side, to prevent the eduction from being performed too soon when the lead is great; but in all cases there is far less lap on the eduction than on the steam side, very often there is none, and sometimes less than none, so that the valve is incapable of covering both the ports at once. The common stroke of the valve in rotative engines is twice the breadth of the port, and the length of the valve face will then be just the breadth of the port when there is lap on neither the steam nor eduction side. Whatever lap is therefore given makes the valve face just so much longer. In some engines, however, the stroke of the valve is a good deal more than twice the breadth of the port; and it is by the stroke of the valve that the amount of the lap is properly measurable.

Sowing Flax.

Flax is usually sown on land which was broken up from grass for a corn crop the preceding spring; but it may also be sown after a manured crop, though in this case the quality of the fiber will rarely be so fine as in the former case. The land should have been deeply ploughed in autumn, so as to secure a fine tilth. The seed, which should, if necessary, be carefully freed from the seeds of weeds by screening, is usually sown broadcast by the hand, and covered by harrowing with the grass-seed harrows and rolling; nine pecks is the usual quantity of seed for an acre. The flax crop in the North of Ireland, where markets for its sale exist, and where it is carefully cultivated and prepared for sale, is very remunerative, so much as £20 ($100) clear profit, over all expenses, rent of land included, being frequently realized. Unless under very careful management flax is, however, a most precarious crop; and, while, on the one hand, it may be the most valuable which the farmer can grow, on the other, it may be the most worthless. Hence the extension of its culture beyond the flax-growing districts should be cautiously undertaken; and hence, also, the reason for the very contradictory statements which one hears regarding the productiveness and value of the crop.

The above is from the *Irish Agricultural Review* and was intended for the sowing of the seed in April in that country; it will answer for May in our Eastern Middle and Western States, and in Canada.

Oak and Iron-clad Ships—Zincked Bolts.

In a verbal communication to the London Chemical Society, Dr. Crace Calvert stated that when iron is placed in contact with oak in vessels, the acid in the oak rusts the metal. The plan which has been adopted to prevent this action, in the English navy, is to place a layer of teak between the iron and the oak. This arrangement, however, did not prevent the corrosion of the bolts which were still exposed to the action of the gallic acid in the oak. To prevent this, it occurred to Dr. Calvert that if the bolts were galvanized they might resist the action of the acid. To test this he obtained a number of zincked bolts and allowed them to remain in contact with oak for a considerable period of time, when he found that the action of the acid was much slower than when the iron was not galvanized, and the iron was also protected from the action of fresh and salt water. From this experiment we conclude that all iron bolts employed for the fastenings of oak timbers in vessels should be galvanized.

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ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING APRIL 8, 1862.

Reported Officially for the Scientific American.

***** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.**

34,868.—G. L. Bailey, of Portland, Maine, for Improvement in Buckles :

I claim the described buckle having one or more tongues rigidly fixed to or made a part of the bow of the same, when made and operating in the manner and for the purpose substantially as set forth.

I also claim the use of the described buckle, in combination with the strap, o, and the loop, B, or its equivalent, substantially as and for the purpose set forth.

34,869.—G. L. Bailey, of Portland, Maine, for Improved Ice Creeper :

I claim in a creeper the extended part containing the openings, E E, in combination with the spur, D, and shoulders, I I, substantially as and for the purpose set forth and described.

34,870.—Timothy Bailey, of Ballston Spa, N. Y., for Improved Washing Machine :

I claim the combination of the self-locking and self-unlocking arms, E, and cranks, G, with the pendants, C, and beaters, D, in the manner and for the purpose shown and described.

[This invention relates to an improvement in that class of clothes-washing machines in which swinging beaters are employed, and consists, first, in a novel way of operating the beaters, whereby they are rendered much more efficient than hitherto, and also rendered capable of being used as wringers, or for the purpose of expressing moisture from the clothes.]

34,871.—W. D. Bartlett, of Amesbury, Mass., for Improvement in Cooking Stoves :

I claim, first, The placing of the fire pot, C, and flues, F H, within the oven, D, arranged relatively with each other, as shown, and with the flues, E G I, at the top, bottom and back of the oven, substantially as and for the purpose set forth.

Second, The chamber, J, communicating with the flue, I, and stove pipe, when said chamber is provided with a partition, j, and valve or door, L, arranged as and for the purpose set forth.

[The object of this invention is to obtain a cook stove which will have a greater radiating surface presented to its oven than usual, thereby not only effecting a material saving in fuel, but also insuring greater efficiency and perfection in baking.]

34,872.—Ira Bisbee, of East Pharsalia, N. Y., and Arza Bisbee, of Polk Township, Mo., for Improvement in Hay Press :

We claim operating the follower, G, of said apparatus, by means of the system of three-jointed levers, C D E, and a suitable actuating lever, when the said levers are made to act harmoniously with each other by means of the fulcrum pin, a, which projects from the central lever, D, into a guiding slot or groove in a portion of the frame of said apparatus, substantially as set forth.

34,873.—J. Brainerd and W. H. Burridge, of Cleveland, Ohio, for Improved Process of Extracting the Strength of Bark for Tanning and other Purposes :

We claim obtaining the extractive properties of bark by the process described.

34,874.—I. N. Brown, of New York City, for an Improvement in Boys' Sleds :

I claim as a new article of manufacture, a boy's sled, A, having a pivoted runner, C, in front, provided with a foot lever or tiller, d, and guiding cord, e, as and for the purposes shown and described.

[This invention consists in the arrangement of a pivoted runner, in front and right, in the middle, between the ordinary runners of a boy's sled, in combination with a foot lever or tiller, and guiding cord, in such a manner that said runner can be turned in either direction, by hand or foot, and that the sled can be guided without touching the ground.]

34,875.—Robert Bryson, of Schenectady, N. Y., for Improvement in Rakes for Harvesters :

I claim, first, The combination of the vertical shaft, E, angular guide bar, I, rake head, I, slotted arm, F, connecting rod, H, vibrating lever, G, and crank, B, in the manner and for the purpose described.

Second, The combination of the many-sided block, K, rake head, J, spring stop, L, incline lugs, N M′, weighted lever hook, M, and weighted tripping hook levers, O O, the whole constructed, arranged and operating in the manner described.

34,876.—Tisdale Carpenter, of Providence, R. I., for Improved Method of Oiling Slides of Steam Engines :

I claim, first, The combination of the oil reservoir at the bottom or either end of the slide and the hollow gib or shoe, substantially as and for the purpose specified.

Second, Furnishing the oil reservoir with a cap piece or shield, d, or its equivalent, formed to direct the oil to the induction opening, b b, of the hollow gib or shoe, substantially as specified.

34,877.—Tisdale Carpenter, of Providence, R. I., for Improvement in Governor Connections for Steam Engines :

I claim combining the governor rod, F, or its equivalent, with the toothed sector, E, for operating the sliding rod or shifting portion, D, of the rocking lever of the valve gear by means of a pin, I, attached to the said rod, F, or equivalent, a slot or slots, c c, in the sector and stationary grooves or guides, d d, the whole applied and operating substantially as set forth.

34,878.—Tisdale Carpenter, of Providence, R. I., for Improvement in Piston Packing :

I claim the arrangement and combination of the circular-expanding spring, C, adjusting screw, E, and nut, h, applied in connection with the packing ring and piston head to operate substantially as and for the purposes specified.

[This invention consists in a novel combination and arrangement of a circular screw and nut and circular-expanding spring, in connection with the packing ring or rings, and head of the piston of a steam-engine pump or other apparatus.]

34,879.—W. H. Chaffee, of Flint, Michigan, for Improvement in Instruments for Measuring Distances :

I claim the combination of the two telescopes, B C, the angular reflecting tube, E, the index, c, and the scale or scales, d e, the whole combined to operate substantially as and for the purpose specified.

[The object of this invention is to measure distances without going over them. It consists of two telescopes, an angular-reflecting tube, an index and a scale, combined and operating in a peculiar manner.]

34,880.—P. D. Cummings, of Portland, Maine, for a Kerosene Oil Burner :

I claim, first, So constructing a lamp for burning kerosene oil that its cone may be removed from over the top of the wick to a position at the side of the lamp, and thereafter be automatically returned to its position over the wick, substantially in the manner set forth.

Second, I claim the sheath, C, in combination with the rod, f, substantially in the manner and for the purpose specified.

Third, I claim removing the cone from its seat upon the lamp, first by a vertical movement and then by a lateral movement of the cone, for the purpose specified.

34,881.—J. C. Davis (assignor to Edward Hall), of County of Alameda, Cal., for Improved Arastras :

I claim in the construction of arastras the combination of a circumferential metallic band, c, and metallic radial gutters, G, with wires, D P, and galvanic battery, as set forth.

34,882.—Simeon C. Davis, of Medina, N. Y., for Improved Method of Grazing Sheep and other Animals :

I claim the employment of movable racks or frames, provided with apertures or spaces in their sides, in such a manner as to allow the animals to reach, without escaping through them, and thereby always to feed upon untrodden grass outside of the racks, substantially as and for the purposes specified.

34,883.—W. H. Doane, of Chicago, Ill., for Improvement in Sawing Machines :

I claim the combination of the reciprocating saw, R S, arm, W, lever, X, pawl, Y, gearing, Z A′ B′ J I, feed rollers, F L, arms, M N, spring, P, and gearing, G H H′, all constructed, arranged and operating in the manner and for the purposes shown and explained.

[This invention has for its object the adapting of a certain arrangement of feed rollers, which was patented by W. H. Doane and C. Mason, July 27, 1858, to a reciprocating saw, whereby the machine above alluded to may be adapted to certain kinds of work which could not be well performed by the circular saw used in the aforesaid machine.]

34,884.—William Fulton, of Elizabeth City, N. J., for Improved Fastener for Lamp Chimneys :

I claim the curved clasp or arms, C, as shown in Fig. 1 and Fig. 4, when attached to and formed of a belt or pin, as shown at B, in Fig. 1 and Fig. 4, and made adjustable, in relation to the chimney, through the instrumentality of a spring, screw, or lever, substantially in the manner and for the purpose set forth.

34,885.—K. H. Elliott, of Eden, Vt., for Improved Clothes Wringing Machine :

I claim, first, The combination of the screw rods, E E, springs, J J, loose collars, H′ H′, and nuts, D D, arranged in relation with the bearings, I, a*, of the roller, shafts, B B′, to operate as and for the purpose, set forth.

Second, The pendant fixed bars, F, in combination with the swivel bars, G, with cams, H, at their lower ends, the above bars being attached to the arms, C C, of the machine, and arranged substantially as and for the purpose specified.

[This invention relates to an improved clothes-washing and wringing machine, of that class in which india-rubber pressure rollers are employed, and has for its object a greater facility than hitherto in attaching the machine to the tub, and also a more convenient and perfect mode of graduating the pressure of the rollers, so that clothes of various kinds and thicknesses may all be operated upon in a proper manner, and by the same machine.]

34,886.—R. W. George, of Richmond, Maine, for Improved Washing Machine :

I claim, first, The employment or use in connection with the dasher, C, of a door, E, so arranged as to serve as a clamp to secure the cleansed portion of the clothes in the dasher and admit of the uncleansed part to project therefrom for the purpose of subjecting them to an additional rubbing operation, substantially as set forth.

Second, The peculiar construction of the reversible door, E, as shown and described, to wit, having one side of convex form corresponding to the curvature of the dasher and the other side of flat form, and composed of two longitudinal parts, F G, with a slide, H, between them for the purpose of expanding said parts so that they may form a clamp for the purpose set forth.

Third, The cords, I I, attached to the concave, B, as shown, when used in connection with the door, E, and dasher, C, for the purpose specified.

[This invention relates to an improvement on a clothes-washing machine, for which Letters Patent were granted on this invention, bearing date April 2, 1861. The object of the invention is to obtain a simple means for effectually cleansing or washing the portions of clothes which require to be operated upon much longer than other parts of the same piece, as for instance the collars and wristbands of shirts.]

34,887.—Firman Goodwin, of Astoria, N. Y., for Improvements in Fish Traps :

I claim the combination of vertically-adjusted seines, B, outer slatted-anchor box, A, inner adjustable slatted fish receptacle, C, and taper decoy seines, D D, substantially as and for the purpose set forth.

34,888.—Richard Hoskin, of Dutch Flat, Cal., for Improvement in Hose Coupling :

I claim a hose coupling consisting of the metal band or clasp, C, loop, c, and key, d, when arranged and operating in the manner described.

[This invention consists in a simple and efficient device for coupling short sections of a hose together.]

34,889.—Augustus Jenny, of New York City, for Improved Washing Machine :

I claim, first, The arrangement of the rotary reciprocating pounder, G, in combination with the adjustable spring washboards, D E, cleats, d d, and line, f, constructed and operating substantially in the manner and for the purpose shown and described.

Second, The holder, H, in combination with the revolving catch, n, spring, n, and pounder, G, substantially as specified.

Third, The arrangement of the arm or wringer, r, in combination with the crank, g, and pounder, G, as and for the purpose set forth.

[This invention consists in the arrangement of a reciprocating rotary pounder, to the lower hinged end of which the clothes are attached by a holder of peculiar construction, and to which motion is imparted by a crank, the front end of which serves as a wringer and also to secure the hinged part of the pounder, when turned up to change the clothes, in combination with two adjustable spring washboards, in such a manner that by the combined action of the pounder and washboards the clothes attached to and moved through the water, with the former, are washed in an expeditious manner, and without injury to even the finest fabric; the clothes holder, as well as the washboards, being adapted to large and small pieces, of a coarse or of a fine texture.]

34,890.—Henry Knight, of Jersey City, N. J., for Improvement in Molds for Cement Pipes :

I claim, first, The combination with a vertical flask, of the lower sliding collar, F, and a central core, substantially as and for the purpose set forth.

Second, The combination of the tubular core, tubular detachable collar, C, and a vertical flask in the manner and for the purpose described.

34,891.—William Levin, of St. Louis, Mo., for Improvement in Apparatus for Economising Fuel :

I claim the peculiarly arranged combination of air chamber, B, the fire chamber, A, the flue, C, the peculiar form of the grate or fuel basket, b b b, when used in connection with the holes, c c c c c, at e and at g, constructed in the exact manner described, and when arranged and operated in the peculiar manner and for the object specified.

34,892.—M. K. Lewis, of Iowa City, Iowa, for Improvement in Carriage Brakes :

I claim making the brake blocks which act on the carriage wheels to turn or rotate on the brake bar and wind chains which are fastened to the brake blocks, and to some part of the carriage so as to wind the chains around the hub of the brake block and draw the brake blocks against the wheels, as described.

And in combination with the above-claimed devices, I claim connecting the breech bar to the pole, substantially as described so as to operate or apply and release the brake by the team.

34,893.—Josiah Long, of Leavenworth, Ind., for Improved Cutter Attachment to Plows :

I claim the cutter, constructed as described, attached to the plow, as and for the purposes set forth.

34,894.—J. D. Lynde, of Philadelphia, Pa., for Improved Bottle for Aerated Liquids :

I claim the valve, as described, and its combination with the rubber spring, L, the hollow valve stem, H, the tube, B, and the hollow mouth piece, A, constructed substantially as described and for the purposes set forth.

34,895.—G. A. Meacham, of New York City, for Improvement in Button Fasteners :

I claim the attachment of the flexible material, D, to the rigid portion of the eye by holding it compressed across the edge of a part, M, or its equivalent, substantially in the manner set forth.

34,896.—David Maydole, of Norwich, N. Y., for Improvement in Skate Fastening :

I claim securing the heel strap, or counter, K, to the back part of the skate, by means of the two plates, H J, placed one over the other, and connected together by a screw or screws, with the lower end of the strap, or counter, placed between the plates, as set forth.

Second, The two plates, H J, the former being provided with a flanch, f, in combination with a screw, a*, on the upper part of the post, B′, and the nut, I, placed on the screw, and fitting in the hole, g, of plate, J, all being arranged as shown, to admit of the heel strap or counter being attached to the skate, and the plates, H J, to the post, B′, thereof, as set forth.

[This invention relates to a new and improved mode of attaching the back part of the skate to the heel of the boot or shoe, and consists in having a hook at the backpart of a heel plate attached to the skate, and a plate provided with two parallel slots attached to the heel of the boot or shoe, the parts being so arranged that the hook on the skate may be passed through the slots in the plate, which is attached to the heel of the boot or shoe, and a perfect lock obtained.]

34,897.—G. A. Meacham, of New York City, for Improvement in Buttons :

I claim, first, A stud or fastening, D d, so constructed as to be capable of being securely attached to the garment, independently of the button, and admit of the button being subsequently attached thereto, in combination with a button head, and having a solid or continuous face, and adapted to be so attached in such manner that it may swivel around freely thereon, substantially as and for the purpose set forth.

Second, I claim a button, having the key or locking piece, C, rotating or otherwise movable within it, and so arranged relatively to the opening, M m, in the back of the button, and to the head, d, of the stud, D, that after the latter has been fixed to the garment the button may be securely fastened thereto, with liberty to move thereon, substantially as set forth.

34,898.—Daniel Merrill, of Worcester, Mass., for Improvement in Ventilators for Railroad Cars :

I claim, first, The specified combination and arrangement of devices, by which the car is supplied with currents of pure air, the same consisting of the tube or duct, K, provided with screens, M M, and valves, L L′, as set forth, the induction pipe, I, the air chamber, D, furnished with dust separators and coolers, as described, the eduction flue, I′, and the distribution pipe, Q, having valves applied to it, as specified, the whole operating together, substantially as set forth.

Second, I also claim the described and peculiar arrangement or application of the screens, M M, to the air-supply box, K, whereby the same not only separate the cinders, &c., from the air, but are rendered self-cleaning, as set forth.

Third, I also claim the construction and arrangement of devices, by which the supply of air to the air chamber, D, is regulated, the same consisting of the weighted valves, o4 o4, and operating in the manner, as set forth.

Fourth, I also claim the combination and arrangement of the two water boxes, C E, and disseminator, F, with the air purifier and cooler, the whole being disposed within the air chamber, D, and so as to operate, as set forth.

Fifth, I also claim the described arrangement of the distribution chamber, Q, provided with valves, as set forth, whereby the purified air is equally distributed throughout the car, the same being substantially as specified.

Sixth, I also claim the arrangement of the registers, for the escape of foul air, viz., in the passage way between the seats, so that such air may pass through a pipe directly under the car into the atmosphere, or under the upper floor and warm the same, prior to escaping out of the discharge passage, the same being substantially as set forth.

34,899.—A. H. Newton, of Worcester, Mass., for Improved Cruet or Decanter :

I claim, as an improved article of manufacture, a cruet or other portable vessel, for holding liquids, provided with a ball, valve or stopper, C, when said valve or stopper is used with a guard or guide, B, which is formed of the same material as the cruet, and combined therewith in one piece, substantially as set forth.

[This invention consists in having the cruet, decanter, or other vessel to which the invention is applied provided with a ball valve or spherical stopper, and also provided with a stopper guard or guide, which is permanently attached to and combined with the vessel. The invention is applicable to vessels constructed of glass, porcelain, or earthen ware, and is designed to supersede the removable spherical stoppers hitherto used.

34,900.—Orrin Newton, of Pittsburgh, Pa., for Improved Holder for Lamp Chimneys :

I claim the use of a chimney holder, consisting of a circular piece of metal or other suitable materal, separate and detached from the burner frame, and surrounding the base of the chimney, and having projecting arms or handles, constructed and operating, substantially as described, for the double purpose of holding the chimney in place in the burner frame, and removing it therefrom, without the necessity of handling the chimney in so doing.

34,901.—R. B. Norman, of Sacramento, Cal., for Improved Furnace for Roasting Ores :

I claim so constructing a desulphurizing furnace, for roasting the ores of precious metals, as that the heat shall be applied first beneath the sole of the furnace, and afterward on the surface of the ore, when the same is combined with a chamber, arranged in the base of the chimney, for the reception of such volatilized particles of ore, &c., as may be driven off by heat, or carried over by the draught, substantially as described.

34,902.—W. R. Pomeroy, of Millersburg, Ohio, for Improvement in Corn Planters :

I claim the recess, g, bar, f, pivot, j, and spring, h, in combination with the wheel, E, and rebate, C, when arranged and operating in the manner and for the purpose described.

[This invention is designed for planting corn in hills, and consists in an arrangement of parts, by which the implement is made to open the ground, drop the corn and cover it at one operation, the coverers being attached to the implement in such a manner as to adapt them to follow the inequalities of the ground, and thereby cover all the corn of uniform depth.]

34,903.—Pinckney Frost, of Springfield, Vt., for Improvement in Scythe Snaths :

I claim the arrangement of the slotted, adjustable wedge, G, screw, D, and movable plate, E, having perforations of the peculiar form shown, with the socket, B, tange, H, bolt, F, and butt, A, as shown and described.

[The object of this invention is to attach a scythe to a snath in such a manner that it will be capable of being adjusted in various positions, to suit the operator, and as circumstances may require, such, for instance, as having its end secured more or less inward toward the outer end of the snath, and also more or less upward in a vertical direction, as well as having its edge its entire length, adjusted more or less upward, so that it will be more or less inclined in its transverse section, the parts being so arranged that the scythe will be firmly secured to the snath, when adjusted in any of the above-mentioned points.]

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34,904.—Timothy Raymond, of Franklinville, N. Y., for Improvement in Lamps:

I claim the arrangement of the wick tube, C, with the movable side, a, spring, c, and screw, d, with the wicks, E and F, connected and used, as represented, whereby the wick, E, is regulated and supplied with oil, substantially as set forth.

34,905.—Caleb Sanborn, of South Berwick, Maine, for Improved Medicine for Croup:

I claim the compounding and mixing the forenamed ingredients, in the manner and relative proportion, as set forth.

34,906.—I. M. Singer, of New York City, for Improvement in Sewing Machines. Patented in England May 9, 1861.

I claim the combination of the feed bar of a sewing machine, with a cam for causing the feeding surface to reciprocate in one direction, and with inclined blocks, that will cause it to reciprocate in a direction crosswise to the first, the combination being such that the feeding surface can be caused to move either longitudinally or transversely to the support of the material, according to the guide which is employed to regulate the direction of the feed, substantially as specified.

I also claim the combination of the feed bar of a sewing machine, with mechanism for raising it and lowering it, that is, constructed in parts, which are adjustable, so as to vary the distance to which the feeding surface is protruded above the support of the work, substantially as specified.

I also claim the combination of the same feed bar, with mechanism for moving it either longitudinally or transversely to the support of the material, and also with adjustable mechanism for varying the protrusion of its feeding surface, substantially as set forth.

34,907.—J. S. Smith, Jr., of New York City, for Improvement in Imitation Metal Embroidery:

I claim the imitation embroidery, composed of the collapsed multi-spiral, A B, constructed substantially as specified.

34,908.—Oliver Snow, of West Meriden, Conn., for Improved Spring for Lamp Chimneys:

I claim the use of a coiled wire spring, in combination with the upper part of the lamp top, to secure the chimney in its place, when they are constructed, attached and fitted to produce the effect, substantially as described.

34,909.—G. L. Squire, of Buffalo, N. Y., for Improvement in Harvester Rakes:

I claim, first, The employment or use of the crank, F, or its equivalent, connecting rod, G, and bearing, I, arranged substantially as shown, and used in connection with the post or swivel head, C, for operating the rake, B, as set forth.

Second, The arrangement of the adjustable bearing, I, of the connecting rod, G, and the adjustable plate, H, which connects the front end of the rod, G, with the rake head, a, in combination with the adjustable pin, f, which connects the back or outer end of the connecting rod with the crank, F, substantially as described, whereby the movement of the rake, B, may be modified or varied, as set forth.

[The object of this invention is to obtain an automatic raking device for harvesters, which will be extremely simple, efficient, economical to construct, and capable of being applied to the harvesters in common use, as well as capable of being adapted for working in various kinds of grain.]

34,910.—Henry Steinway, Jr., of New York City, for Improvement in Pianoforte Actions:

I claim, first, The arrangement of the levers, D E, post, G, spring h, and screw, k, relatively to the key, the jack and the hammer, substantially as set forth.

Second, The arrangement of the regulating screw, m, and fixed rail, n, in combination with each other, and the lever, E, substantially as set forth.

34,911.—J. L. Swan, of Lowville, N. Y., for Improvement in Firearms:

I claim the breech, h, and barrel, b, fitted as specified, in combination with the socket, a, receiving the parts, as set forth, when the explosion is effected by a piercing hammer, 5, entering the detonating cap in the conical hole, 6, of said breech, h, substantially as set forth.

34,912.—Almon Swift, of Wolcott, Vt., for Improvement in Corn Shellers:

I claim the combination of the peculiarly-constructed cylinder, G, having not only a series of flutes, f f, but a surface between each two of them, with the inclined receiver, F, the rasping cylinder, B, and its concave, D, constructed and operating as and for the purpose specified.

34,913.—George Teed, of New York City, for Improvement in Banjos:

I claim the sound board, C, interposed and forming a means of connection between the parchment head, B, and the rim, A, substantially as and for the purpose specified.

And I also claim the ring, D, having an annular cavity, a, receiving within it, the ring, b, and hooks, c c, and forming a means of connection between the head, B, and sound board, C, substantially as described.

[This invention consists in the arrangement of a sound board between the parchment head and the rim of the banjo, the object being to give a more powerful and finer tone to the instrument.]

34,914.—S. H. Timmons, of Memphis, Tenn., for Improvement in Locomotive Lamps:

claim adjusting the distance between the lens, g, and the reflector, C, so as to converge or diffuse the light, as may be desired, by means of the rod, o, or its equivalent, extending from the lamp to the caboose of the engine, within the immediate control of the engineer, substantially as described.

34,915.—Elmer Townsend, of Boston, Mass., for Improvement in Sewing Machines:

I claim the combination of the postal carriage, and its operative mechanism, not only with an apparatus, substantially as described, for feeding and sewing an article to be sewed, but with a postal work supporter, arranged relatively to the main frame of the sewing machine, as represented.

I also claim the combination and arrangement of a removable bearing plate, N, with the postal work supporter, B, and the postal carriage, A, when applied to sewing mechanism of the kind, and to operate in manner substantially as described.

34,916.—Thomas Warker, of New York City, for Improvement in Apparatus for Aerating Liquids:

I claim, first, The arrangement of two faucets, D E, one to communicate with the gas space and the other with the water space of the receiver, B, as and for the purpose described.

Second, The arrangement of the vertical tube, c, in combination with the connecting collar, C, and gas faucet, D, substantially as and for the purpose set forth.

Third, The combination and arrangement of the generator, A, receiver, B, collar, C, ball valve, a, tube, c, faucets, D E, and safety valve, F, all constructed and operating, substantially in the manner and for the purpose shown and described.

34,917.—Linn Van Order, of Ithaca, N. Y., for Improvement in Mica Lamp Chimneys:

I claim so constructing the frame work of the chimney as to inclose the edges of the mica on all sides, and making one end adjustable, so as to allow the ready and easy removal of the mica, for the purpose of cleaning the same, or renewing it when worn out, soiled or otherwise injured.

34,918.—A. B. Travis, of Brandon, Mich., for Improvement in Seed Drills and Cultivators:

I claim the frame, F, having the standards, f, and teeth, g, attached, connected to the draught pole, C, by the universal hinge or joint, e, resting on the adjustable bolster, D, and operated through the medium of the rock shaft, I, lever, H, and slotted bar, G, all arranged as and for the purpose set forth.

[The object of this invention is to obtain a cultivator and seed drill, the teeth of which may be readily shifted laterally by the attendant, in order to conform to any irregularities in the rows of a crop under cultivation, and also to evade obstructions, such as stones, stumps, &c., which may lay in the path of the teeth. The invention has further for its object a simple means for regulating the depth of the penetration of the teeth in the soil, and the adjusting of the teeth, so that they may operate nearer to or farther from the rows of plants, as circumstances may require.]

34,919.—C. R. Alsop, of Middletown, Conn., assignor to J. W. Alsop, of New York City, for Improvement in Percussion Cap Primer:

I claim in the construction of a portable hand primer, first, The extension, F, in combination with a circular percussion cap primer and spring plunger, the whole constructed and operating substantially in the manner and for the purposes described.

Second, The tubular extension, F, made with a right-angled discharge passage, and with an annular partition, i, applied for the purpose and in the manner described, to a circular percussion cap primer.

Third, A circular percussion cap primer of the character described, so constructed that it holds a cap in suspension out of the circle of the top of the case, A, and by the pressure of the thumb upon one of its parts forces the said cap vertically upon the nipple of a firearm, substantially as described.

34,920.—D. B. Clement, of Milton, Mass., assignor to C. B. Boyce & Co., of Boston, Mass., for Improved Clothes Wringer:

I claim applying the power of a single spring, H, to both ends of the roll, E, through the levers, G, substantially as described.

34,921.—E. E. Conrad (assignor to Henry Coulter), of Philadelphia, Pa., for Improvement in Holders for Lamp Shades:

I claim, first, The clamps, a a a a, for the purpose of holding the shade as and for the purpose set forth and described.

Second, clamps, a a a a, in combination with the double braces, b b b b, and the wire rim, C, in the manner and for the purpose specified.

34,922.—Charles Draeger (assignor to himself and John Ott), of Indianapolis, Ind., for Improvement in Repeating Firearms:

I claim, first, The arrangement of a cartridge magazine, B, revolving on a longitudinal axis, as shown;

Second, A plunger, p, and needle, n, constructed as set forth, and combined in their operation with a revolving magazine, as stated substantially; and

Third, The helical spring, S, when used as shown, for the purpose of rotating the cartridge magazine, B.

34,923.—J. C. Holston, of Derry, N. H., assignor to S. M. Davis, of Lawrence, Mass., for Improvement in Coffee Roasters:

I claim the combination of the hinged door, B, the wire, C, passing through the hollow tube, E, used to open and close the door, B, and the catch, F, with a corn popper or coffee roaster, when constructed substantially as described, and for the purposes set forth.

34,924.—Philander Rouse, of Macedon, N. Y., assignor to himself and W. S. Higgins, of North Bridgewater, Mass., for Improved Top-Sail Rig:

I claim the third or intermediate yard, the lower yard, the topsail yard, and the single topsail, as arranged and applied together, substantially in manner and so as to operate as specified.

I also claim the arrangement and combination of the elevating screw, I, or its mechanical equivalent, with the mast or its cap, the three yards, and the auxiliary yard supporter or brace, H, the whole being to operate substantially as specified.

34,925.—H. B. Thomas (assignor to J. W. English), of Racine, Wis., for Improvement in Dampers:

I claim the valve composed of the ring and annular plate, A, and the two disks, C C, and spindle or journals, a a, the whole arranged and applied in combination with each other, substantially as specified.

34,926.—Rosewell Thompson, of Boston, Mass., assignor to himself and J. C. Wilder, of Boston, Mass., and Z. W. Holden, Jr., of Bristol, Mass., for Improvement in Sewing Machines:

I claim the guard, k, upon the hook, E, in combination with the driving pins, d, substantially as described and for the objects specified.

Second, Constructing the bobbin case, g, with a start, h, upon its outer end, substantially as described, for the purpose of confining said case so as to revolve with the hook, and also to act as a cast off for the thread when the point of the hook has entered the loop formed by the needle.

34,927.—J. W. Wilcox, of New York City, assignor to E. H. Ensign, of Orange, E. C. Bridgeman, of Clifton, and T. C. Fanning, of Brooklyn, N. Y., for Improvement in Envelops:

First, I claim the combination of a tape or string with an envelope so attached as to allow of being shipped around to move the knot, as described, but not to admit of removal when tied with the effect, substantially as set forth.

Second, I also claim an envelope constructed in the box form, or with a rectangular transverse action, and strengthened by eyelets, e f, or their equivalents, as described and shown.

Third, I also claim, in envelopes of the box form, the use of the supplementary flaps, c d, at the ends, substantially as and for the purpose specified.

34,928.—Isaac Winslow, of Philadelphia, Pa., assignor to J. W. Jones, Portland, Me., for Improved Indian Corn Preserved Green:

I claim the described new article of manufacture, namely, Indian corn when preserved in the green state without drying the same, the kernels being removed from the cob, hermetically sealed and heated, substantially in the manner and for the purposes set forth.

34,929.—Smith Groom (assignor to himself, Jacob Shaver and Lewis Potter), of Troy, N. Y., for Improvement in Stoves:

I claim the combination of the annular steam chamber, O, with the fire chamber, R, and the outside wall, E, substantially as and for the purpose described and set forth.

I also claim the combination of the annular chamber, O, and the annular steam pipe, N, with the boiler, B, by means of the pipes, D C, substantially as and for the purpose described and set forth.

34,930.—T. S. Lambert, of Peekskill, N. Y., for Improvement in Cooking Stoves:

I claim, first, The application of one or more division plates, extending along the flue under the oven from one side of its bottom to its central diagonal line, in all those cases in which the draught passes under the oven bottom at one side and leaves it from another at right angles to the former, substantially as set forth.

Second, The termination of the inner extremities of those division plates at the central diagonal line, by parabolic curves, substantially as set forth.

Third, The continuation of those plates after they have curved, if they are continued along the flue under the oven till they reach the flue at the back of the oven, substantially as set forth.

Fourth, The attachment of division plates to the movable section of the bottom of the oven in such a manner that when the section is raised the division plates are removed and the flue easily cleaned, substantially as as set forth.

Fifth, The construction of a flue across the entire back of the oven and leading to the pipe colar after the products of combustion have traversed four sides of the oven, substantially as set forth.

Sixth, The application of division plates in the back flues with graduated lengths to assist in equalizing the distances from different parts of the fire box to the pipe collar, in the direction of the draft, substantially as set forth.

Seventh, The application of the independent slides, C C, or of one of them with its back holes twice as far apart as its front ones so as to control the draft in the front and back part of the fire box independently of each other, or together, as may be desirable, substantially as set forth.

Eighth, The application of the division plate in the ash pit, for the purpose of supplying air to the back part of the fire box, substantially as set forth.

Ninth, The application of a wide-margined grate rest, with perforations and a scolloped edge, or either of these devices in combination with a movable fire plate at the side of the fire box, substantially as set forth.

Tenth, The construction of the slide of the oven above the grate rest, substantially as set forth.

Eleventh, The construction of the damper rod with one or more joints, substantially as set forth.

Twelfth, The construction of holes in the margin of the sides and back of the bottom, in combination with the dampers leading into and out of the oven for the purpose of using the range as a heater when "jacketed," substantially as set forth.

Thirteenth, The combination of the slides or slide, C, or the division plate, D, with the perforated or scolloped grate rest, the partial and movable grate cover and the movable fire plate, substantially as set forth.

Fourteenth, The combination of the draft dampers or damper, the dampers over the oven, and the division down the flue at the side of the oven, under its bottom and up its back, substantially as set forth.

Fifteenth, The combination of the dampers leading into the ash pit or either of them, and those leading into and out of the oven with the holes in the sides of the margin of the bottom, substantially as set forth.

Sixteenth, The combination of each and all the three classes of improvements and particulars mentioned in the immediately previous three claims in one stove, substantialy as set forth.

34,931.—T. A. Timmins and A. F. W. Edwards, of Philadelphia, Pa., for Improvement in Hammock Tents:

We claim, in combination with a circular tent having vertical walls, a series of hammocks, E, arranged radially within the tent and connected to the pole of the same, the series of guy ropes, G, and standards, D, when the latter, together with the canvas cover, and aided by the guy ropes, serve to form the vertical wall, and when the several parts are connected together and arranged as and for purpose set forth.

34,932.—C. W. Williams, of Boston, Mass., for Improvement in Sewing Machines:

I claim, first, The combination of a feeding instrument, having a reciprocating movement in a horizontal plane only, with two independent pressers so arranged that one shall press the cloth so as to attach it to the feeding instrument, and the other shall hold the cloth upon the table, said pressers operating alternately, substantially in the manner described.

Second, Connecting the two pressers with each other and with the needle arm, by a lever, or its equivalent, arranged and operating substantially as described.

RE-ISSUES.

1,298.—A. G. Bevin, of Chatham, Conn., for Improved Mode of Attaching Sleigh Bells to Straps. Patented July 22, 1856:

I claim securing sleigh bells to straps by means of staples, rivets, bolts, or their equivalent, passing through the straps and bells, substantially as described.

[The nature of this invention will be fully understood by the claim. It is a great improvement on the old mode of attaching bells to the straps.

1,299.—J. C. Birdsell, of West Henrietta, N. Y., for Improvement in Machinery for Hulling and Thrashing Clover. Patented May, 18, 1858:

I claim the arranging and combining in one machine the cylinder which thrashes the balls and seed from the straw or stalks, and the cylinder which hulls the seed, so that the balls and seed thrashed may be hulled before it (the seed) passes out of the machine.

And in combination with the thrashing and hulling cylinders above claimed, I claim the bolting or screening and conveying apparatus, which separates the bells and seed from the straw or stalks and delivers them to the hulling cylinder.

And in combination with the thrashing and hulling cylinders, I claim the screening and fanning apparatus which separates the hulls or balls and cleans the seed, after it leaves the hulling cylinder.

1,300.—Henry Eddy, of North Bridgewater, Mass., for Improvements in Cribs for Horses. Patented Jan. 6, 1857:

I claim, first, The application and use of the inclined planes, H H, with the vertical opening, I, between them, in combination with the sides of the crib, E F, substantially as specified and for the purposes set forth.

Second, I claim the space, g h k, partially inclosed by inclined planes, H A, with the opening, I, substantially as specified.

Third, I claim the ventilator, o, in combination with the planes, H H, substantially as described.

Fourth, I claim the cap, K, when applied to the crib, D, substantially as described and for the purpose set forth.

DESIGNS.

1,562.—George Crompton, of Worcester, Mass., Design for Top Rail of Weavers' Looms.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design Patents, when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

Receipts.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

Invariable Rule.—It is an established rule of this office to stop sending the paper when he time for which it was pre-paid has expired.

Patent Claims.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

New Pamphlets in German.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
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PATENTS FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from $30 down to $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
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On filing Disclaimer	$10
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On filing application for Design, seven years	$15
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The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co No. 37 Park-row, New York.

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We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

C. H. McC., of Ill.—We briefly alluded recently to the subject of your letter upon the taxation of patented articles. The question is one of great importance to our manufacturers of such articles. The tax really appears to be unjust to them. It would perhaps be more wise to lay a heavier tax upon fixed property and exempt manufactured articles.

T. P. P., of Mass.—We know of no apparatus for indicating the exact weight of water except the tube scale attached to measure. There are a variety of water meters, for determining the quantity of water that passes through a pipe. Engravings of several of these devices have been published in our paper. We hardly know which is practically the best. If we are not mistaken you will be able to see some of these in operation at the office of the Cochituate Water Works, Boston, Mass. Your plan of measurement for the intended purpose is very good. We should be pleased to receive any articles that you think would interest our readers.

A. H., of C. W.—The idea of putting elastic plating on the sides of ships is not new. It is now being tried upon one of the gunboats in the Mississippi river. Your projectile is old and we think your ballooning apparatus of doubtful novelty and utility.

C. S., of N. Y.—If you have not the means wherewith to try your experiments, and cannot procure aid from some friend to enable you to do so, you will have to give it up for the present at least.

M. J. K., of N. Y.—Your plan of raising heavy guns into a turret like the *Monitor's* and lowering them at every discharge we think would be impracticable. If they could be thus raised and lowered there would be no occasion for a turret; and possibly without the supports of a turret in the way the plan might be made to work. It does not seem very promising, however.

J. F. A., of N. Y.—Probably the reason why the two indicator cards of which you speak, are not alike in that portion of the stroke after the steam was cut off, is that in one case water was carried over from the boiler and evaporated as the pressure was reduced in the cylinder.

J. C. A., of Mass.—The only portion of your communication that has any interest you request us not to publish.

T. B. M., of N. J.—Overman's work on "The Manufacture of Iron," published by Henry C. Baird, of Philadelphia, contains directions for making sheet iron.

E. B. H., of Me.—The answer to your question whether the prevalent diseases of the throat are caused by burning coal oil, would be very interesting if an answer could be given with any certainty of its correctness. But the cause of disease is by far the most obscure branch of medical science, and we presume that physicians would be very much divided in the answers they would give to your question.

W. C. E., of Mo.—The plan you suggest, of attaching an implement similar to a pair of scissors to the muzzle of a gun for cutting off the cartridge, is very good, but it is not new. A patent has been applied for on the same invention recently. In taking a patent as an improvement on some other person's patented invention you can only use the improvements you have made; not any portion which is covered by the claims of the first patentee, without his consent.

A. W., of Ohio.—The question of the inferiority of the African race is one that we have never investigated in a scientific point of view, therefore we do not propose to discuss it. The more it is discussed the more diversity of opinion there will be on the subject. Such differences as do really exist are appreciable to the senses.

H. H., of Mass.—There is no novelty in providing projectiles with steel points; nor is there any in discharging one projectile from another as you propose. Considering your projectile as a whole, we have never seen anything precisely like it, and think it probable a limited claim might be made on it.

E. C., of Ind.—Concrete for underground walls is made by mixing dry, one peck of good hydraulic cement with two pecks of clean gravel, then wetting the mixture and using it immediately as a mortar for laying the wall. Or boards may be secured to form a box of the width of the wall, and the mortar may be made so thin that it can be poured into the trough together with the stones to form the wall. Unless hydraulic cement is used immediately after it is wet, it is worthless. It becomes hard in a few minutes.

S. E. J., of N. Y.—We are not able to advise you in regard to the practical value of the roofing cement to which you refer. You should correspond with those who have used it.

S. L. E., of Mich.—The caloric engine answers a good purpose where but little power is required.

A. C., of N. B.—We will keep your model subject to your order. If at any time you should decide to apply for a patent you may depend upon our best services.

J. G. N. of Vt.—We advise you to procure Brewster's Optics. It is a small work but will answer your purpose.

A. C., of N. Y.—There is no limit to the velocity of a projectile resulting from the resistance of the atmosphere; but the higher the velocity, the more rapidly it is reduced by this resistance. Prof Norton, of New Haven, estimated the velocity of one of the large meteors at 21 miles per second. An air gun does make a report louder than that of a pop gun; the thickness of the barrel would modify the sound.

W. L. T., of Pa.—Black is dyed on wool by different processes. You can do it in a very simple manner by boiling the wool for half an hour in a liquor in which two ounces of the bichromate of potash, and one pound of fustic is used for every eight pounds of wool. Take it out and air it, then boil it for a full hour in logwood liquor containing the extract of three pounds of logwood chips. After this it must be thoroughly washed. If it has a grey or slaty appearance, it is a sign that it has not received a sufficient quantity of logwood; if it is rusty and brown, it is a sign that the logwood liquor was too strong. Remove a portion of the logwood by rinsing the wool in very delicate sulphuric acid, and wash well in warm water. There are several other methods of coloring wool black.

SPECIAL NOTICE—FOREIGN PATENT.—The population of Great Britain, is 30,000,000; of France, 35,000,000; Belgium, 5,000,000; Austria, 40,000,000; Prussia, 20,000,000; and Russia, 60,000,000. Patents may be secured by American citizens in all of these countries. Now is the time, while business is dull at home, to take advantage of these immense foreign fields. Mechanical improvements of all kinds are always in demand in Europe. There will never be a better time than the present to take patents abroad. We have reliable business connections with the principal capitals of Europe. Nearly all of the patents secured in foreign countries by Americans are obtained through our agency. Address Munn & Co., 37 Park row, New York. Circulars about foreign patents furnished free.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, April 16, 1862:—

N. A., of N. Y., $30; J. B., of N., $20; J. A. W., of N. Y., $20; E. F. B., of Conn., $20; R. and P., of Mass., $15; W. H. H., of N. Y., $10; F. W. C., of N. Y., $15; W. H. W., of N. Y., $25; J. M. D., of Va., of $15; W. D. D., of Ill., $25; B. and E. H., of Ill., $15; E. J. W., of N. Y., $12; J. C. M., of Ill., $15; A. and A., of Ill., $15; J. M. Le C., of Wis., $25; A. H., of Minn., $25; P. N. H., of N. J., $15; W. M., of O., $15; P. P., of N. Y., $15; A. C. K., of N. Y., $25; F. A. B., of N. Y., $45; A. J., of Iowa, $20; D. and H., of N. Y., $20; M. and S. S., of O., $25; C. C. C., of N. Y., $25; B. R. A., of N. Y., $140; E. D. G., of Conn., $25; J. S., of Mass., $15; G. and J., of R. I., $15; M. and K., of Ill., $15; C. L. G., of N. Y., $100; J. P., of N. Y., $50; C. T. W., of Mass., $25; J. D. S., of Ill., $25; W. R., of Mich., $25; J. O. C., of Wis., $15; L. H. D., of Iowa, $15; W. W. B., of N. Y., $15; G. W. N., of Mass., $15; H. T., of N. Y., $15; J. B. S., of Prussia, $46; E. M. A., of N. Y., $40; S. H. N., of Iowa, $20; G. B. O., of N., Y., $30; A. B. B., of Conn., $25; A. and M., of Wis., $30; A. McG., of N. Y., $25; J. R. W., of N. Y., $15; H. B. J., of N. J., $25; J. B., of Ind., $15; P. W. McK., of N. J., $15; J. E. H., of Mass., $25; W. J., of Wis., $30; N. A. B., of N. Y., $10; C. H. W., of Mass., $25; E. Y. C., of Ind., $10; C. B. S., of Mass., $15; L. C. C., of Mass., $18; J. W. B., of N. Y. $20; A. S. H., of Ill., $25; A. S., of Ill., $30.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from April 9 to Wednesday, April 16, 1862:—

J. W. B., of N. Y.; J. R. B., of Ind.; A. H., of Minn.; B. R. A., of N. Y.; J. B. S., of Prussia; W. G. P., of Del.; W. C. S., of N. Y.; J. R. A., of Pa.; A. B. B., of Conn.; W. H. W., of N. Y.; E. J. W., of N. Y.; G. B. O., of N. Y.; A. C. K., of N. Y.; J. M. Le C., of Wis.; C. H. W., of Mass.; C. T. W., of Mass.; H. T., of N. Y.; L. E. C., of Mass.; W. D. D., of Ill.; A. McG., of N. Y.; H. B. J., of N. J.; C. C. C., of N. Y.; M. and S. S., of Ohio; W. R., of Mich.; J. D. S., of Ill.; E. Y. C., of Ind.; A. S. H., of Ill.; J. E. H., of Mass.; J. P., of N. Y., 2 cases; L. A. S., of N. Y.; E. D. G., of Conn.; M. P. T., of N. Y.; N. A., of N. Y.

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MILLS.—WE ARE MANUFACTURING SEDGEbeer's Improved Conical French Burr Mills; price $120. Sedgebeer's Patent Champion (iron) Mills; price $40 and $50, and Sedgebeer & Haven's Patent Nonpariel (iron) Mills; price $40 and $50, to which we invite the attention of millers, farmers and others requiring mills to pulverize any substance. Descriptive circulars mailed free to all on application to JAS. L. HAVEN & CO., Cincinnati, Ohio. 16 3*

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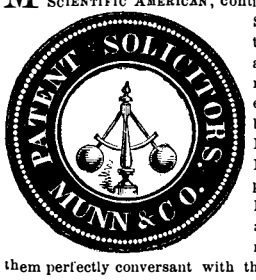

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Immediately after the appointment of Mr. Holt to the office of Postmaster General of the United States, he addressed to us the subjoined very grateful testimonial:—

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Your obedient servant, J. HOLT.

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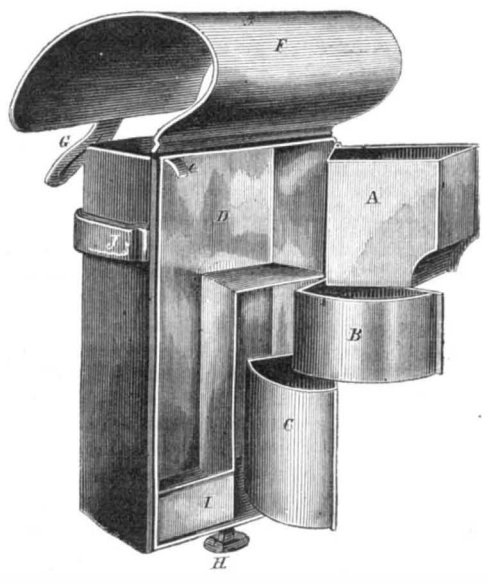
HIRSCHBUHL'S AMMUNITION BOX FOR ARMY OFFICERS.

The accompanying engraving illustrates an ammunition box intended for army officers to carry the powder, balls, caps and cartridges needed for their pistols. It consists of a light leather box lined with tin, divided into compartments and provided with small interior boxes hung upon hinges at one side, so that they may be swung out when it is desired to take the ammunition from them.

The upper box, A, is designed to hold the balls, the middle box, B, the percussion caps, and the lowest, C, the prepared cartridges. The compartment, D, is for the powder flask, which is held in place by the spring, *e*. The leather face, F, is made to turn up out of the way, as represented, and when it is closed, the tongue, G, is secured by the button, H. A loop is provided at the back of the box for the waist belt of the bearer, and two loops, J, upon the sides for the shoulder strap. The small compartment, I, at the bottom is for wads.



The lowest drawer of the box may contain a vial of oil and a pin for cleaning the tube. These are held by an open ring which is soldered to the inside of the drawer in such a manner as to form a spring to hold the vial and pin without breaking, and still to allow a larger or smaller vial to be used.

The special novelty of this box is the attachment of the compartments, A B and C, by hinges at their sides, enabling them to be turned out so that their contents will be readily accessible.

The patent for this invention was granted through the Scientific American Patent Agency, February 18, 1862, and further informatibn in relation to it may be obtained by addressing the inventor, J. S. Hirschbühl, at Louisville, Ky.

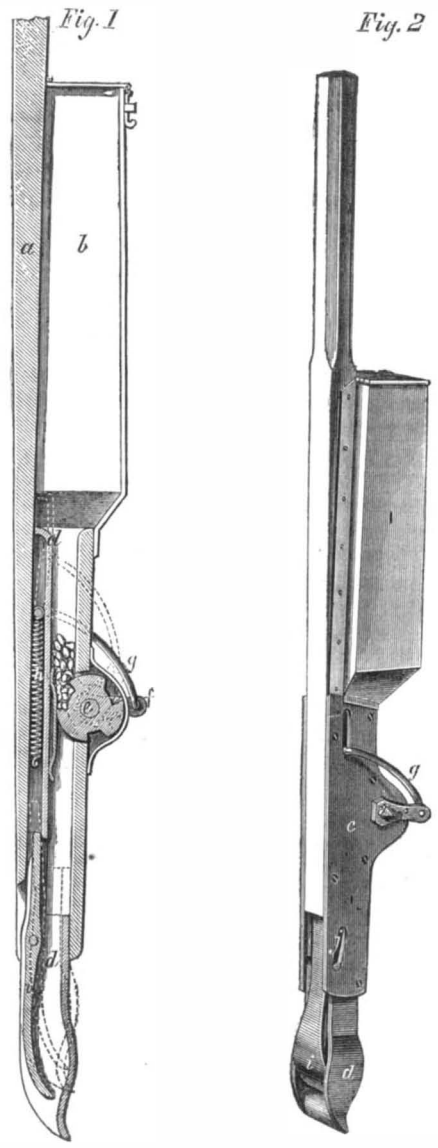
Feathering Screw Propellers.

The British frigate *Aurora*, of 51 guns, 227 feet long, 50 feet breadth of beam, with a capacity of 2,558 tuns, has been fitted with a Maudslay feathering propeller. The diameter of this screw is 17 feet, and the angle of the blades can be varied till they are set in a fore-and-aft position. In a recent trial with this vessel, which took place at Plymouth, the blades were first set at a pitch of 22 feet 6 inches, and their angle was altered from the quarter deck, when the screw was in motion at full speed. The advantages of this description of propeller are, that it enables a vessel to proceed under canvas alone, without lifting the screw out of the water, by placing the blades fore-and-aft in a line with the keel, in which position they offer little or no resistance to the progress of the vessel through the water. By thus altering the screw to any required pitch, advantage is taken of varying winds in long voyages, so as to use sail and steam according to circumstances, and thus save fuel.

At the battle of Austerlitz the Russians lost 30 per cent and the Austrians 44 per cent of their army, the French 14 per cent; at Wagram the Austrians lost 14 per cent, the French 13; at Waterloo the Allies lost 31 per cent, the French 36; at the battle of Magenta the Austrians lost 8 per cent, the French only 7 per cent.

SHORES'S HAND CORN PLANTER.

Among all the farm implements invented in modern times we know of none which saves so much labor in proportion to its cost, as the hand corn planter. After the field is furrowed in one direction, the workman may set his stakes, and, taking one of these little tools, may walk across the field in a straight line, at right angles to the furrows, planting a hill as he crosses each furrow as rapidly as a person can drop the seed; thus saving the labor of furrowing the field in one direction, and of covering the corn. Since the first invention of this valuable implement many improvements have been made in its construc-



tion, designed to render iteither cheaper, lighter or more certain in its operation. One of the latest and best of these is illustrated in the accompanying engravings.

Fig. 1 is a vertical section of the principal parts, and Fig. 2 a perspective of the whole implement. To a light wooden handle, *a*, is secured a tin box, *b*, and thin iron plates, *c*; the edges of these plates being connected by a strip of wood to complete the box. Inserted into the lower end of this box is the cast-iron trough, *d d*, which extends upward to the lower end of the tin box, *b*; this trough being secured in such manner that it has a sliding motion up and down within the box. The tin box, *b*, is filled with seed which is prevented from falling down through the lower end of the planter by the wheel, *e*. This wheel has a notch cut in its edge of sufficient size to hold the quantity of seed suitable for one hill, and it will be seen that if this notch is turned down, the charge of seed will be carried past the wheel and dropped into the lower part of the implement. To the axle of the wheel is rigidly secured the arm, *f*, which is connected with the trough, *d*, by the rod, *g*; this rod being bent so as to pass through a long slot in the plate, *c*. As the workman presses the lower end of the implement into the ground, the trough, *d*, is forced upward in the box, thus turning the wheel, *e*, and dropping a charge of seed. When the planter is raised, the trough is again drawn down by the spiral spring, *h*, and the notch in the wheel, *e*, is turned up to receive a second charge of seed for the next hill.

The lower end of the trough, *d*, is closed by a curved tongue, *i*, which has its fulcrum at its upper end and receives a horizontal vibrating motion at each vertical movement of the trough, *d*, from a pin which passes through the tongue and enters inclined slots, *j*, in each of the plates, *c*. As the lower end of the trough is pressed into the ground the lower end of the tongue, *i*, is pressed against it, as represented in dotted lines; but as the implement is raised the passage is opened, as shown in full lines, allowing the seed to fall into the hill.

The advantages claimed for this planter are, that it is durable, cheap and easily operated and that it may be relied on for accuracy. The price is three dollars.

The patent for this invention was granted, through the Scientific American Patent Agency, July 2, 1861, and further information in relation to it may be obtained by addressing the inventor, S. Z. Shores, at Towanda, Pa.

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